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DISEASES CAUSED BY BACTERIA AND FUNGI.

CRAWFORD, A. B. (1936). **Tuberculin Reactions in Cattle Showing No Visible Tuberculous Lesions on Postmortem.**—*J. Amer. vet. med. Ass.* **89.** 562-583. 2 figs., 1 table. [12 refs.]

C. reports an investigation on some cattle, imported from Guernsey and found on arrival in America to react to bovine tuberculin. Lymph node tissue from a reactor was injected into g. pigs and later passaged through many other laboratory animals and calves. Finally, an undoubted avian strain (KC41) of *Mycobact. tuberculosis* was isolated.

Mention is also made of the experimental infection of cattle with human tubercle bacilli, carried out 35 years ago at the author's research institute. No cases of generalized tuberculosis resulted, but tuberculin reactions were obtained, usually only once, from most of the test cattle.

In 1931, six cattle were made to drink from one to 20 doses of human tuberculous sputum in water, but only three reacted later to tuberculin.

The other problem causing confusion in routine tuberculin testing is the " skin lesion " case, there being no doubt that the organisms found in skin lesions do cause sensitivity to tuberculin. Two new organisms of this kind are here described, both being acid-fast (Fort Bayard and Poole strains). They were grown on various media and caused skin lesions in experimental cattle, and reactions to tuberculin were irregularly obtained (more strongly with avian tuberculin). A " tuberculin " was made from the Fort Bayard strain and gave some positive reactions in tuberculous and " skin lesion " cattle, but to a less extent than the American standard tuberculin. Attempts to incriminate soil bacteria as the cause of skin lesions have not been successful.—J. E.

MADDOCK, E. C. G. (1936). **Experiments on the Infectivity for Healthy Calves of Bovine Tubercle Bacilli Discharged in Dung upon Pasture. Part I. From Tubercular Calves Fed with Emulsions of Tubercle Bacilli 1934-5. Part II. From Tubercular Cows passing Tubercle Bacilli in their Dung 1935-6.**—*J. Hyg., Camb.* **36.** 594-601. 3 tables. [2 refs.]

Three calves, whilst being fed on an emulsion consisting of 12 virulent strains of bovine tubercle bacilli from various sources, and proved to be excreting the bacilli in their dung, were grazed on an area of approximately 2/11ths of an acre for three weeks. The calves were then slaughtered and the area divided into three plots. After intervals of one, two and three months a separate pair of tuberculosis-free calves were allowed to graze each of the plots for three weeks. On subsequent tuberculin testing and *post-mortem* examination all six calves proved to be free from any evidence of tuberculosis. It is pointed out that the infection of the pasture was heavier than would occur on ordinary pasture grazed by tuberculous animals, or on pasture that had been dressed with manure infected with tubercle bacilli.

Similar results with six more tuberculosis-free calves were obtained when a tuberculous cow passing virulent bacilli in her dung was previously grazed for nine and a half weeks on the pasture.

The conclusion, therefore, appears to be that the danger of infection from pastures previously naturally infected is slight, and the danger from pastures manured with ordinary farmyard manure still more remote.—N. J. Scorgie.

I. Ruddock-West, T., & Alpe, F. T. (1936). **Demonstration of Tubercle Bacilli in Milk by Cultural Method.**—*J. State Med.* **44.** 543-545.

II. Bezançon, F., & Braun, P. (1936). Technique de la culture des selles pour recherche des bacilles de Koch. [**Culture of** *Mycobact. tuberculosis* **from Faeces**].—*C. R. Soc. Biol. Paris.* **122.** 772-774.

III. Mattick, A. T. R., & White, P. (1935). **Routine Tests for the Presence of Living Tubercle Bacilli in Cows' Milk.**—*Med. Offr.* **54.** 265-267. 1 table. [1 ref.]

I. The sediment of milk, centrifuged at 3,000 R.P.M. for 20 minutes, is treated with 20% H_2SO_4 for three minutes, neutralized with NaOH and sown on a modified Löwenstein-Jensen medium, details of which are given. Cultures are incubated for 10 to 14 days and then examined in the usual way. Of 904 samples of milk from individual cows, all were negative on microscopic examination, and 45 gave a positive result by this method.

II. 8 to 10 g. of faeces are mixed in a mortar with 25 to 30 c.c. of 4% NaOH. In order to destroy secondary bacteria, sodium oxyquinoleate is added to a concentration of 2 to 3 c.c. per 500 c.c., and the mixture is incubated at 37°C. for 24 hours. According to the deposit that results, 300 to 400 c.c. of water are added, and the mixture is thoroughly shaken and filtered through several layers of gauze. The filtrate is centrifuged for one hour, and the deposit is slowly acidified lightly to litmus with 4% HCl, and sown into tubes of Petragnani-Löwenstein medium.

III. This statistical analysis covers the results of routine biological tests of 3,346 bulk samples and 1,149 samples of milk from separate cows. The authors found that where bulk milk was examined by the inoculation of a single g. pig, 84 re-investigations were necessary for each 1,000 samples owing to deaths from " intercurrent infection " whilst 62 positive results were falsely returned as negative. When two g. pigs per sample were used, only seven re-investigations following the death of both animals were needed and only four falsely negative results were returned.

As regards samples from separate cows, where one g. pig per sample was used, 76 per 1,000 infected samples required a re-examination owing to the death of g. pigs from " intercurrent infection ", and more than 17 per 1,000 samples were returned as falsely negative. When two g. pigs were made use of, fewer than

six g. pigs per 1,000 samples succumbed to " intercurrent infection " and less than one falsely negative result accrued.—J. W. EMSLIE.

I. CORPER, H. J., & COHN, M. L. (1936). **Studies on the Behavior of Tubercle Bacilli within the Body. I. The Fate of Virulent and Avirulent Tubercle Bacilli Injected Intracutaneously into Normal Animals.**—*Amer. Rev. Tuberc.* **33.** 678-693. 14 figs. on 2 plates.

II. CORPER, H. J., COHN, M.L., & DAMEROW, A. P. (1936). **Studies on the Behavior of Tubercle Bacilli within the Body. II. The Fate of Virulent and Avirulent Tuberle Bacilli Injected Intracutaneously into Immune Previously Inoculated Guinea Pigs.**—*Ibid.* 694-700. 4 figs. on 1 plate.

III. CORPER, H. J., DAMEROW, A. P., & COHN, M. L. (1936). **Studies on the Behavior of Tubercle Bacilli within the Body. III. The Local Cutaneous Reaction to Virulent Tubercle Bacilli in Guinea Pigs.**—*Ibid.* 701-708. 31 figs. on 3 plates.

IV. CORPER, H. J., COHN, M. L., & DAMEROW, A. P. (1936). **Studies on the Behavior of Tubercle Bacilli within the Body. IV. The Cutaneous Reaction to Avirulent Bacilli and Immunity.**—*Ibid.* 709-720. 38 figs. on 3 plates.

V. CORPER, H. J., DAMEROW, A. P., & COHN, M. L. (1936). **Studies on the Behavior of Tubercle Bacilli within the Body. V. The Effect of the Inoculation of Avirulent Tubercle Bacilli on Subsequent Virulent Infection in Animals.**—*Ibid.* 721-732. 7 figs. on 1 plate. [Numerous refs.]

I. The fate of four different strains of tubercle bacilli (virulent and avirulent human, virulent bovine, and virulent avian) was studied, following injections (intraderm.) into g. pigs, rats, rabbits and dogs. The results indicated that tubercle bacilli, avirulent or non-pathogenic for an animal species, when injected in small amounts, have a definite tendency to disappear from the site of inoculation and from the occasional site of deposition in the internal organs. Tubercle bacilli virulent for the species in question tend to multiply at the site of inoculation and to disseminate in the internal organs unless the amount inoculated is very small.

II. G. pigs were immunized with injections (intraven.) of avirulent tubercle bacilli and then given relatively large injections (intraderm.) of virulent or avirulent human tubercle bacilli. The distribution of the bacilli in the body was studied at varying intervals by delicate culture methods suitable for determining small numbers of viable tubercle bacilli in the tissues. Only slight differences were found between normal and immune g. pigs injected with virulent bacilli, though macroscopically there was a striking difference in the amount of tuberculous involvement. With avirulent human tubercle bacilli injected (intraderm.) the culture findings revealed no striking differences with the larger injections, but with small injections there appeared to be a decided retardation of dissemination of the bacilli from the intracutaneous site in the immune as compared with the normal g. pigs.

III. G. pigs were injected with virulent bovine or human tubercle bacilli (intraderm.) and the effect of this first injection on second and subsequent injections studied. Following a primary injection of as little as 0·000,001 mg. of a virulent strain a definite ulceration occurred. Second or subsequent injections of similar doses to the first showed a definite retardation of the lesions and in some cases there was a complete absence of reaction. The protective effect which increased gradually required a certain interval of time to develop. It appeared to exert no effect on lesions already in existence.

IV. Viable avirulent human and bovine tubercle bacilli produced no more local tuberculous skin lesions when injected (intracut.) than equivalent amounts of dead tubercle bacilli of the same strain, or dead virulent human or bovine strains. G. pigs, rabbits and dogs were used for the tests and in no case did reasonable doses of the bacilli give rise to progressive disease. Experiments were then performed to determine the effect of the injection of avirulent tubercle bacilli upon subsequent intradermal infections with virulent tubercle bacilli one to three months later. There resulted a definite retardation in the development of the intradermal lesion produced by the virulent bacilli. No such retarding effect was observed, however, when heat-killed virulent or avirulent bacilli were substituted for the live avirulent bacilli in primary injection.

V. Intravenous injections of avirulent human or bovine tubercle bacilli into g. pigs in even relatively large amounts (5 mg.) resulted in an acute splenomegaly which usually resolved without leaving definite gross tuberculous changes. In dogs and rabbits similar amounts produced no evident gross changes. Such injections in both g. pigs and dogs were shown to retard the development of subsequent infections with virulent human or bovine tubercle bacilli. In equal amounts heat-killed avirulent and virulent tubercle bacilli exerted no such effect.

—A. Robertson.

I. Yanagisawa, K. (1936). **On the Influence of Inorganic Reducing Substances on Experimental Tuberculosis.**—*Jap. J. exp. Med.* **14.** 395-452. Numerous tables and charts. [10 refs.] [In English].

II. Tompkins, Edna H. (1936). **The Effects of Intravenous Injections of Lecithin on Tuberculosis in the Rabbit.**—*Amer. Rev. Tuberc.* **33.** 625-638. 2 tables. [Numerous refs.]

III. Smithburn, K. C. (1936). **The Standardization of Longevity against Dose in Experimental Tuberculosis by Intracerebral Inoculation.**—*J. exp. Med.* **64.** 771-790. 11 figs. on 3 plates, 3 tables, 2 charts. [17 refs.]

IV. Vidal, C. B. (1935). **The Effects of adding Various Substances to Suspensions of Tubercle Bacilli in Experimental Infection.**—*Amer. Rev. Tuberc.* **32.** 601-603. 1 table. [4 refs.]

V. Steinbach, M. M., Klein, S. J., & Deskowitz, M. (1935). **Experimental Diabetes and Tuberculosis in the Dog.**—*Ibid.* 665-676. 6 figs. on 2 plates, 2 tables. [10 refs.]

I. The effect of nine simple inorganic substances on the development of experimental tuberculosis was estimated, 80 g. pigs being used for each substance (60 experimental animals and 20 controls). Infection was by injection (subcut., one dose) with 0·1 or 0·001 mg. of a virulent human strain. The injections of chemicals were usually made once or twice a week. After ten weeks all surviving animals were killed and autopsied.

Sodium thiosulphate appeared to exert a remarkable inhibitory action on the development of tuberculosis, independently of the infecting dose, and the time of beginning the treatment. Ferrous chloride, colloidal sulphur, colloidal iron and colloidal copper all exerted an inhibitory action which appeared to be related to the degree of infection and the time of beginning the treatment. Manganese chloride, sodium sulphide, and sodium nitrite accelerated strikingly the development of tuberculosis. Stannous chloride had no influence on the development of the disease.

II. Separate groups of rabbits were injected (intraven.) with bovine tubercle bacilli, one group receiving lecithin (intraven.) both before and after injection and

the other only after injection. All rabbits showed early lung lesions. In both test groups the lung lesions tended to heal and be less extensive than in the controls and the test groups also survived longer than the controls.

III. In attempting to produce a standardizable infection with tuberculosis, intracerebral inoculation of g. pigs appeared most suitable. This induced acute meningo-encephalitis with minor metastatic lesions. The disease was fatal in a relatively short time (from 10 to 30 days) and was characterized by a rather typical succession of symptoms – listlessness, weakness of the hind quarters and paralysis of one or both hind legs, followed by coma and death. The disease was produced by very small doses of bacilli and, under standard conditions, the survival time was very uniform. S. suggests the use of this method in testing the potency of antisera, the efficacy of therapeutic or prophylactic measures and the virulence of tubercle bacilli.

IV. The addition of nutrient material such as egg-white or whole rabbits' blood to a suspension of virulent human tubercle bacilli, before injection into g. pigs, exerted little influence on the subsequent lesions found eight weeks after injection, as compared with non-nutrient materials such as paper pulp or agar. But all four materials appeared to have a definite enhancing effect on the tuberculosis found, as compared with controls in which salt solution alone was used as the diluent for the bacilli.

V. Five pancreatomized dogs and three control dogs which had undergone laparatomy and were closed without injuring the pancreas, were inoculated (intraven.) with virulent bovine tubercle bacilli in doses of 1 mg. per lb. body weight. Attempts were made to compensate for the loss of digestive enzymes by adding pancreatic substance to the food. The diabetic animals developed severe generalized tuberculosis, but only slight tuberculosis was found in the controls.

In another group of five dogs in which diabetes was temporary, due to regeneration of pancreatic tissues, no tuberculosis developed.

The authors consider that the increased susceptibility to the tubercle bacillus was probably associated with faulty carbohydrate metabolism.—A. ROBERTSON.

I. ANON. (1935). Le relazioni dei veterinari vaccinatori. [**BCG Vaccination of Cattle in Italy**].—*Notiz. Ist. antituberc. Milano.* **13.** 60-77. 3 tables.

II. ANON. (1936). Le relazioni dei vaccinatori. [**Reports of BCG Vaccination of Cattle in Italy**].—*Ibid.* **14.** 3-16.

III. ANON. (1936). Agricoltori che affermano la efficacia e la innocuità del B. C. G. [**Farmers' Reports on the Results of BCG Vaccination of Calves**]. —*Ibid.* 37-52.

IV. ANON. (1936). L'esperimento vaccinale della stazione sperimentale per le malattie infettive del bestiame de Brescia. [**BCG Vaccination of Calves by the Veterinary Research Institute, Brescia**].—*Ibid.* 60.

These are reports on the use in Italy of BCG prepared and issued by the Istituto Vaccinogeno Antitubercolare, Milan.

I & II. Contain several reports by veterinarians.

III. Contains information supplied by farmers, *i.e.* the numbers of calves treated and opinions on the results.

IV. Prof. UBERTINI, Director of the Veterinary Research Institute for Brescia, reports the adoption of a BCG campaign in the province. Early results verify the innocuity of the vaccine in the new-born calves.

[In none of the above articles are data given to afford an idea of the value of BCG in reducing the incidence of TB. in the cattle treated].—J. E.

MAGENTA, B. (1934). Risultati negativi nella vaccinazione antitubercolare dei bovini mediante il B.C.G. La bicigite dei bovini. [**Failures of BCG Vaccination of Calves**].—*Profilassi.* **7.** 99-106 and 448-459. 25 figs. [English, French and German summaries].

M. studied the effects of BCG vaccination of commercial herds of cattle kept under rather poor hygienic conditions in a northern district of Italy. The observations extended over a period of several years.

He states that in calves, a few days after vaccination, a rise of temperature accompanied by general signs of ill-health is frequently observed and that there may also be a local reaction at the site of inoculation. In some cases, this illness progressed and a few calves died. *Post-mortem* examination of such cases showed that there was a more or less generalized adenitis, and that areas of gelatinous degeneration under the mucous membrane of the small intestine were also sometimes seen. Biological tests confirmed the presence of tubercle bacilli in the lymph nodes.

Observations of adult cows vaccinated one or more times showed several cases in which the vaccine appeared not to protect animals against infection, typical tuberculous lesions being found *post mortem.* M. concludes that BCG cannot always be relied upon to protect animals against a natural infection. [There is the possibility that some of the animals may have been infected before vaccination, as the tuberculin test was not applied].—J. A. NICHOLSON.

ALBISTON, H. E., & TALBOT, R. J. de C. (1936). **Johne's Disease in Victoria.**—*Aust. vet. J.* **12.** 125-138. 2 tables, 1 chart. [10 refs.]

The article opens with a very full account of the spread of Johne's disease in Victoria from farm to farm. In the course of investigations into the diagnosis of the disease, it was found that apparently healthy cattle slaughtered at the abattoirs often show evidence of enteritis, ranging from patchy petechiation of the mucosa to definite inflammation of extensive areas, and that the ileocaecal valve is sometimes congested and even enlarged, oedematous and dark red or purple in colour. A. and T. consider, therefore, that when such lesions are found *post mortem*, they have not the significance in relation to Johne's disease that many writers state. The difficulty of establishing diagnosis at *post-mortem* examination is stressed. On account of the practical impossibility of thoroughly examining the whole of the intestinal tract, A. and T. focus attention mainly on the last few feet of the ileum, the ileocaecal valve, the caecum and the first portion of the colon.

The results obtained with the johnin test were not as good as those reported by several other authors. Not only could positive reactions often not be confirmed at *post-mortem* examination, but, what is more serious, the test gave no reaction on one infected cow.—W. I. B. BEVERIDGE.

PATRIZI, F. (1935). L'infezione da bacillo del mal rossino negli ovini. [*Erysipelothrix rhusiopathiae* **Infection in Sheep**].—*Nuova Vet.* **13.** 366-372. 1 fig.

P. was unable to isolate *E.r.* from lambs which came from districts where swine erysipelas was prevalent. Transmission experiments with the organism, isolated from an infected pig, were then carried out. It was found possible to infect sheep only if they had been previously sensitized by means of small doses of the organism killed by heat. Sensitive animals could be infected by injections (intraven. or subcut.), or by the application of the organism to the surface of the wound left after docking. The characteristic lesions from which the organism could be recovered were endocarditis and enlargement of the joints.—J. A. N.

LÁSZLÓ, F. (1936). Beitrag zur pathologischen Anatomie und pathologischen Histologie der chronischen Pasteurellose der Kälber. [**Pathology of Chronic Pasteurellosis in Calves**].—*Dtsch. tierärztl. Wschr.* **44.** 296-297. [Also appeared in *Állatorv. Lapok.* **59.** 297-298].

An examination was made of the tissues of calves with chronic pasteurellosis and showing large numbers of Gram-negative coccobacilli in their blood and tissues. The opinion is expressed that the pathological anatomy and the pathological histology are not sufficiently characteristic, but that further studies of the changes in the spleen and lymph nodes in chronic pasteurellosis of calves are desirable.—R. LOVELL.

KALIKIN, B. (1935). Eksperimentalni studij mehanizma infekcije i imuniteta kod kolere peradi. [**Experimental Study of the Mechanism of Infection and Immunization in Fowl Cholera**].—*Jugoslov. vet. Glasn.* **15.** 373-380. [12 refs.]

The opinion of TOMAŠEC, who says that the digestive juices may play an important role in resisting infection *per os*, cannot be accepted. In order to test the bird's immunity to fowl cholera, infection *per os* can be usefully applied, but only if there has been previous injury of the mucous membrane of the alimentary canal.

K. demonstrated that, for successful infection with fowl cholera *per os*, lesions must already be present in the alimentary canal. Infection was only produced when the bird was previously given fodder containing crushed glass particles. —B. OSWALD (SKOPLJE).

CARPANO, M. (1936). Osservazioni e ricerche sulle infezioni da Pasteurella nel pollame in Egitto. [**Enzootic and Epizootic Fowl Cholera in Egypt**].—*Profilassi.* **9.** 69-72. 3 figs., 2 tables. [English and French summaries].

C. records that, although the incidence of fowl cholera has been greatly reduced in Egypt, sporadic cases of atypical pasteurellosis are met with even in flocks kept under strict control. Bacteriological examinations showed that the organism responsible for these cases is a typical pasteurella, but that it differs in its morphological and cultural characteristics from the organism responsible for fowl cholera. A distinction should, therefore, be made between enzootic and epizootic pasteurellosis of fowls.—J. A. NICHOLSON.

SVERÁK, A. (1936). Experimentální hodnocení nové selektivní půdy Höklovy pro rozlišovánískupiny coli od salmonella. [**Differentiation of *coli* and Salmonella Groups by Hökl's Culture Medium**].—*Zvěrolék. Rozpravy.* **10.** 186-192, 199-204 and 205-207. 1 fig. on 1 plate. [13 refs.] [German summary].

Hökl's culture medium may be used with success for the differentiation of *coli* and salmonella groups. The composition is as follows :– agar-agar, 7·5 ; horse-flesh bouillon, 500 c.c. ; sodium chloride, 2·5 g. ; peptone, 5 g. ; lactose, 5 g. ; 1·5% alcoholic brom-thymol-blue solution, 0·5 c.c. ; 0·5% alcoholic fuchsin solution 5 g. ; sodium sulphide, 1·5 g.

The culture medium has a green colour ; its pH is from 7·2 to 7·4. The *coli* colonies are red, and the salmonella colonies are blue.—E. PŘIBYL (BRNO).

I. PALTRINIERI, S. (1935). Sul pericolo della febbre ondulante da contagio bovino in Sicilia. [**Bovine Contagious Abortion and Undulant Fever in Sicily**].—*Nuova Vet.* **13.** 331-336. [3 refs.]

II. ALESSANDRINI, A., & DOMINICI, D. (1936). Osservazioni epidemiologiche sull'andamento della infezione brucellare negli animale dell'Agro Romano. [**The Incidence of Brucella Infection in Animals in the Vicinity of Rome**]. —*Ann. Igiene* (*sper.*). **46.** 97-113. 1 table. [17 refs.]

III. DEL VECCHIO, G. (1936). Brucellosi dei suini e degli equini (da un'inchiesta in Terra di Bari). [**Porcine and Equine Brucellosis in the Province of Bari, Italy**].—*Igiene mod.* **29.** 53-59. 4 tables. [7 refs.]

I. Brucellosis is wide-spread in Sicilian cattle, sheep and goats, but in cattle the incidence of abortion is much lower than in northern European countries. This is not due to any peculiarity in the breed of cattle kept on the island and, although climatic conditions may play some part, it is more likely that the calves become infected very early in life and develop a natural resistance which is sufficient to prevent abortion when they reach breeding age. Since the inhabitants drink little cows' milk, cattle do not appear to be responsible for the spread of the disease to man.

II. A comprehensive survey of the incidence of brucella infection has shown that the disease is extremely common amongst cattle in the district round Rome. Approximately 67 % are infected and the infection is also prevalent among horses.

In this survey, diagnosis was based on the agglutination test and on the results obtained with a brucellin. This latter substance was prepared by growing *Br. melitensis* and *Br. abortus* in 1 % glucose broth for 20 to 30 days and then adding sufficient agglutinating serum to clarify the liquid. The clear liquid was decanted off and after the addition of 0·5 % formalin was ready for use. The dose for sheep and goats is 0·5 c.c., and for cattle and horses 2·5 c.c., injected into the subcutaneous tissue of the lower eyelid. It is claimed that this brucellin gives very satisfactory results.

III. The results of agglutination tests with 800 blood samples from pigs and horses show that brucellosis is wide-spread in the province of Bari. Infection appears to be more prevalent among boars than among sows ; approximately 13 % of the pig population is infected ; 30 % of the blood samples from horses were positive, but in this case there did not appear to be any difference between the sexes.—J. A. NICHOLSON.

MIGLIAVACCA, L. (1936). La vaccination intraveineuse dans le diagnostic, la cure et la prophylaxie de l'avortement épizootique des bovins. [**Diagnosis, Cure and Prevention of Bovine Contagious Abortion by Intravenous Vaccination**].—*Rev. Microbiol., Paris.* **2.** 256-258.

The vaccine is a suspension of dead *Brucella abortus*, of which 2 c.c. are inoculated (intraven.) every eight days until four or five doses have been given. After inoculation there is a rise in temperature, accompanied by muscular tremors and a temporary fall in milk yield. This febrile reaction is more marked in positive reactors to the agglutination test, but does occur in negative animals. The vaccine has been used on 643 animals and M. claims that it greatly reduces the number of abortions, decreases the spread of the disease, reduces calf mortality to 2 % and prevents arthritis and sterility due to *Br.a.*—A. W. TAYLOR.

LANFRANCHI, A., & PACCHIONI, G. (1934). Contributo sperimentale e clinico alla infezione da Brucella abortus negli equini e negli ovini. Nota I. Osservazioni negli equini. Nota II. Osservazioni sugli ovini. Nota III. Influenza di vari fattori sopra il comportamento del tasso di agglutinazione del siero di sangue di animali infetti da Brucella abortus. [**Experimental *Br. a.* Infection in Horses and Sheep**].—*Nuova Vet.* **12.** 165-171, 237-240 and 460-461. 13 figs. [6 refs.]

I. It was found possible to infect horses, asses and mules experimentally by injection (subcut.) of 1 c.c. of *Br.a.* culture. The incubation period varied between six and ten days. Local abscesses which showed no tendency to heal developed at the site of inoculation and at the same time general symptoms with a sharp rise of temperature set in. These, however, passed off fairly quickly. It was found impossible to recover the organism from the blood stream, but it was always present in the local lesions. The agglutination titre rose rapidly during the first week and it is considered that a titre greater than 1 : 100 may be regarded as a positive reaction. Only in one case was it possible to recover the organism from the reproductive organs.

II. Pregnant and non-pregnant sheep were experimentally infected with *Br.a.* and blood samples taken at frequent intervals for agglutination tests. The original blood titre was 1 : 50 and a rise was not noticed until six days after inoculation. The highest titre observed was 1 : 1,000. There were, however, wide fluctuations. Abortion was not always produced in pregnant sheep nor did healthy animals kept with the infected sheep contract the disease.

III. L. and P. were unable to influence the agglutination titres of animals experimentally infected with *Br. a.* by injections of " atoxyl," adrenaline, " trypaflavine " or pirotoxin.—J. A. NICHOLSON.

ORLANDINI, C. (1936). Ricerche sulla ipersensibilita'alla " Br. abortus suis " negli agnelli. [**Hypersensibility of Lambs to** *Br.a.*, **Porcine Type**].—*Nuova Vet.* **14.** 160-165. 4 figs.

Three lambs, which received four increasing doses – spoken of as sensitizing – of killed *Br.a.*, porcine type, were injected 11 days after the last dose with a massive dose of the same organism. A pronounced hypersensitivity had developed and the agglutination titre rapidly rose to 1 : 10,000. No effect was produced on the blood corpuscles nor did the haemoglobin content of the blood alter. A neutrophilia had developed after the second dose, but this gradually disappeared. The sedimentation rate of the blood increased during the experiment.

—J. A. N.

I. WHITBY, T. L., BOSWORTH, T. J., & INNES, J. R. M. (1936). **A Case of Suppurative Epididymitis in a Dog caused by** *Brucella abortus*.—*Vet. Rec.* **48.** 662-664. [9 refs.]

II. DEL VECCHIO, G. (1936). Les réactions de Wright et de Weil-Felix essayées sur les chiens de la Province de Bari. [**Results of Serological Tests on Dogs for Brucella Infection in Bari, Italy**].—*Boll. Sez. ital. Soc. int. Microbiol.* **8.** 121. [2 refs.] [In French].

I. A 12-year-old Aberdeen terrier, blind and very fat, had been subject for some time to polyuria, together with a variable swelling of one testis. It was killed and, on autopsy, revealed excessive fluid in the cavum vaginale on one side, while pus was present in the epididymus, from which *Br. a.* was isolated.

On isolation the addition of CO_2 was necessary for growth, which was not prevented by the presence of methyl violet (1 : 50,000), basic fuchsin (1 : 25,000), or pyronin (1 : 100,000).

Thionin (1 : 6,000) inhibited growth. H_2S was produced only during the first 48 hours of aerobic incubation. Sera from a rabbit immunized against this organism, and from one immunized against *Br. a.* of a bovine strain, were examined by fractional absorption, and cross-agglutination, and corresponded. The organism was, therefore, accepted as being of a bovine strain. The pathological findings are given in detail.

II. The blood serum from 53 dogs in the province of Bari was examined for agglutinins against *Proteus* X19, and against *Br. abortus* and *Br. melitensis*.

Eleven sera giving agglutination against proteus were also positive against brucella. The possibility of non-specific agglutination is put forward. No technique is given.—H. H. HOLMAN.

AJELLO, L. (1933). Lesioni anatomo-patologiche da iperrecettività alla brucella Bang nella cavia. [**Pathological Lesions in Guinea Pigs Re-Infected with** *Brucella abortus*].—*Boll. Ist. sieroter. Milano.* **12.** 817-840. 12 figs. on 2 plates, 1 table. [Numerous refs.] [German summary].

In order to study the lesions produced by *Br. a.*, A. inoculated g. pigs with heat-killed suspensions and, when they reacted to the intradermal test, reinoculated them with small doses of the organism. The animals were divided into groups and the reinoculations made into the testis, spleen, liver, lungs, joints or central nervous system. Control animals were also inoculated at the same time.

The sensitized animals lived for a maximum of 34 days after reinoculation, whereas the mortality rate amongst the control animals was negligible. On *post-mortem* examination, all the sensitized g. pigs showed similar lesions which were congestion of the viscera, enlargement of the spleen and parenchymatous degeneration of the liver. Those animals which were reinoculated in the testis showed a fibrotic degeneration of this organ, but the vesiculae seminales appeared to resist the toxic action of the organism. The adrenal glands constantly showed lesions which consisted of haemorrhagic extravasations and necrotic foci, particularly in the reticular layer.

The cells present were giant cells, histiocytes, eosinophiles and some polynuclear cells. The bacilli tended to become localized in the lymphatic and blood-forming organs and in the lungs.

There appears to be a close similarity between the lesions produced by *Br. a.* and *Mycobact. tuberculosis* and it is probable that in the human subject the former have often been mistaken for tuberculosis.—J. A. NICHOLSON.

BER, A. (1936). Badanie krwi i ciepłoty wewnętrznej u świnek morskich i królików zakażonych pałeczka Banga. Doniesienie III. Posiewy ze krwi i narządów wewnetrznych u świnek morskich i królików zakażonych pałeczka Banga. [**Pathogenesis of Brucella for Laboratory Animals. Part III. The Cultures from Blood and Other Organs of Guinea Pigs and Rabbits Infected with** *Br. abortus*].—*Wiad. weteryn.* **15.** 354-366. 3 tables. [15 refs.] [French summary].

A detailed account of the pathogenicity of laboratory strains of *Br. a.* inoculated intraperitoneally into g. pigs, most of it being along orthodox lines.

—A. SZWABOWICZ (LWÓW).

DAYUS, C. V. (1937). **Dipping Mortality associated with Vibrion Septique Infection.**—*N.Z. J. Agric.* **54.** 170-171.

D. drew attention to the fact that *Clostridium septique* was to be found in the sludge at the bottom of dips, and that susceptible sheep could thus be infected as they passed through the dips. Losses had occurred on several occasions in Otago following dipping operations. It is, therefore, essential to clean out the dips thoroughly each year.—C. S. H. HOPKIRK.

I. POCHON, J. (1936). Recherches sur l'origine de l'immunité antitétanique naturellement acquise des ruminants. [**Origin of naturally Acquired**

Immunity to Tetanus in Ruminants]. *Ann. Inst. Pasteur.* **57.** 82-90. 4 tables. [8 refs.]

II. Mespoulet, R., Lemétayer, E., & Bardot, C. (1936). L'anatoxine tétanique chez le cheval. Immunité de la jument et du poulain. [**Tetanus Anatoxin in the Horse. Immunity of the Mare and Foal**]. *Rev. Immunol.* **2.** 388-397. 2 tables. [12 refs.]

III. Thibault, P. (1936). La réaction locale après injection d'anatoxine tétanique seule ou enrobée dans la lanoline. [**Local Reaction after Injection of Tetanus Anatoxin, Alone or in a Lanoline Base**]. *Ibid.* 508-512. 2 figs. [8 refs.]

IV. Schmidt, S., & Steenberg, Else. (1936). Comparaison entre l'effet stimulant du tapioca et de l'hydroxyde d'aluminium additionnés à l'anatoxine tétanique destinée à l'immunisation du cheval. [**Comparison between the Stimulating Effects of Tapioca and Aluminium Hydroxide added to Tetanus Anatoxin for Immunizing Horses**]. *Acta path. microbiol. scand.* **13.** 401-403. [1 ref.] [In French].

V. Rawlings, W. B., & Hottle, G. A. (1936). **Studies in the Duration of Immunity of Horses Against Tetanus Following Active Immunization with Alum Tetanus Toxoid.** *N. Amer. Vet.* **17.** No. 5. 30-32. 1 table. [3 refs.]

I. P. found *Clostridium tetani*, though only in small numbers, in the neutral or slightly alkaline contents in the rumen of two out of ten normal cattle. He shows that a filtrate of the content of such rumen favours the growth of *Cl. tetani* to a limited extent, but that any toxin produced in these circumstances is rendered atoxic. Another cultural experiment shows that the metabolic products of *Plectridium cellulolyticum* upon cellulose have an even greater attenuating effect upon tetanus toxin. The combined gradual multiplication of *Cl. tetani* and the chemical and fermentative actions upon tetanus toxin probably account for the natural immunity acquired by cattle to tetanus. P. shows that the multiplication of *Cl. tetani* is impossible in the stomachs of animals with simple stomachs (equidae, g. pigs, etc.), and that artificially introduced toxin is rapidly destroyed.

II. M., L., & B. treated thoroughbred in-foal Arab mares with three doses given at about monthly intervals, each of 10 c.c. tetanus anatoxin, combined with tapioca. This is said to have protected the mares from tetanus resulting from parturition injuries. [There is no evidence as to the incidence of the infection in unprotected animals].

A reinforcing dose of vaccine is said to be effective for succeeding pregnancies. Foals from such vaccinated mares possessed an adequate passive immunity lasting about 30 days but it was reduced almost to nil at 6 months of age. At this period two doses of the same vaccine were given to the foals at an interval of one month. The immunity produced in foals was not so strong as in mares, but was of the strength expected in immature as compared with adult animals.

III. T. injected various mixtures into four groups of g. pigs in order to determine by examination, at intervals of from 6 hours to 10 days after injection, the histological reaction produced in the skin lesions by tetanus anatoxin embedded in lanoline. He showed that the reaction to anatoxin in saline is transitory and substantially the same as that produced by a mixture of broth and saline, whilst lanoline alone, or combined with anatoxin, produces a persistent type of inflammatory connective tissue reaction, identical with that resulting from the injection of various oily bases alone.

IV. The authors compared the immunity response in horses to tetanus anatoxin mixed with tapioca or aluminium hydroxide. Their experiments were made with an anatoxin of a strength of 4-5 neutralizing units per c.c. Two groups

of 15 horses were used, and the sera of these were tested one month after a single (subcut.) injection of either mixture.

For the first group of horses 3% of tapioca was mixed with 10 c.c. of the anatoxin. Eleven horses showed practically no immunity response and the other four gave serum titres of about 0·02 units of antitoxin (AU) per c.c.

The second group of horses received 10 c.c. [misprinted as 100 c.c.] of anatoxin to which was added 10% of aluminium hydroxide. Ten of these sera had titres between 10 and 100 AU, and three of them closely approximated to 100 AU. Four other sera were of a strength between 0·5 and 2 AU and only one serum had a titre of less than 0·5 AU.

V. The authors injected serum horses with two 10 c.c. doses of alum tetanus toxoid at intervals of one to three months. This produced serum titres, varying from 0·001 to more than 0·02 units of antitoxin per c.c., 18 to 21 months after the first injection of toxoid. One 10 c.c. dose of the same toxoid produced an inadequate immunity (less than 0·001 unit of antitoxin per c.c.) within a fortnight of the injection, but 4 out of the 5 horses had serum titres of 0·001 per c.c. soon afterwards.—C. V. Watkins.

I. Rose, A. L. (1936). **The Control of Black Disease by Vaccination.**—*Aust. vet. J.* **12.** 185-189. 3 tables. [2 refs.]

II. Bennett, W. G. (1936). **The Control of Black Disease, Blackleg and Entero-Toxaemia in Tasmania.**—*Ibid.* 192-196. 1 table.

III. Wardle, R. N. (1936). **Infectious Necrotic Hepatitis (Black Disease) Control, with Special Reference to Vaccination. With a Note on Vaccination against Entero-Toxaemia and Black Leg.**—*Ibid.* 189-192. 1 table.

IV. Wardle, R. N. (1936). **The Technique of Black Disease Vaccination in the Field.**—*Ibid.* 154-155.

V. Bennetts, H. W. (1936). **The Control of Entero-Toxaemia of Sheep.**—*Ibid.* 196-202. 1 table. [4 refs.]

I. Field vaccination against black disease with formalinized cultures showed that two injections of vaccine reduced the mortality quite considerably as compared with unvaccinated controls, while three injections reduced the mortality still further. Comparative tests with a proprietary single-injection vaccine showed that it gave almost as good protection as Turner's double-injection vaccine. Vaccination has proved to be a practical and economical measure for controlling black disease.

Vaccination was apparently effective in checking the mortality of lambs from enterotoxaemia, and is particularly valuable in the case of lambs raised for the fat lamb trade. The chronic form of enterotoxaemia, described by the author in 1934, responds well to vaccination.

II. According to the reports of farmers vaccination against black disease proved in many instances, to be 100% effective in preventing losses. In most parts of Tasmania, fluke snail control measures are impracticable, but vaccination has proved most satisfactory.

Prior to the introduction of vaccination against blackleg in calves, this disease sometimes caused the loss of almost all the calves born in some districts during a calving season. Vaccination is now widely practised and practically no losses occur subsequent to vaccination.

III. W. stresses the need for vaccination against black disease to be carried out during the late spring and early summer before losses begin. Although the ideal method of controlling black disease is to eradicate the fluke snail and drench

against fluke these methods present many difficulties in practice. Vaccination has proved to be an effective means of controlling the disease in the field.

IV. Full details of the technique employed for field vaccination are given.

V. In Western Australia losses from enterotoxaemia can be prevented effectively by only one method of control other than vaccination, namely, turning sheep on to " bush country ". This invariably checks losses within three or four days. Other methods occasionally prove effective, but also sometimes aggravate the losses. The reduction in death rate from enterotoxaemia by vaccination was approximately 80%. Apart from the influence on the mortality, vaccination has a beneficial effect on the health of flocks in which the disease is enzootic. Immunity produced by vaccination commences to diminish 3 to 6 months after inoculation, but experimental results suggested that some degree of resistance may persist for 13 months. The disease tends to disappear from districts in which it was prevalent eight years ago and to spread to other areas.

In the discussion following these papers, SEDDON related that blackleg in sheep in New South Wales had been confused with swelled head due to *Clostridium oedematiens*. Young merino rams seem very susceptible to blackleg and vaccination has proved effective in protecting them. TURNER, summarizing the results of all vaccination trials with black disease, said that in 13,742 unvaccinated controls there were 3·6% deaths as compared with 1·3% in 16,337 sheep receiving two doses of vaccine and 0·5% in 4,888 receiving three doses of vaccine. ROSE stated that he does not disinfect the site of inoculation when vaccinating, and has never had any untoward sequelae. He vaccinates sheep at the rate of 650 per hour and has done as many as 4,000 sheep in one day. In advising the best method to adopt in controlling black disease it is necessary to inspect the property first, as the local conditions determine which method should be adopted. Snail destruction is often the best method, but complete eradication of the snail is not possible in practice.

—W. I. B. BEVERIDGE.

GHINELLI, I. (1936). Su di un focolaio di bradsot delle pecore nelle Marche. **[Bradsot in Sheep in Marche, Italy]**.—*Nuova Vet.* **14.** 299-305. 3 text figs., 1 plate.

A Gram-positive anaerobic organism was isolated from material taken from sheep which had died suddenly and which showed lesions of gastro-enteritis. The organism proved pathogenic for g. pigs, pigeons and experimental sheep, death occurring within 48 hours. The chief lesions were a diffuse subcutaneous oedema, congestion of the abdominal vessels, enlargement of the spleen, peritonitis and fatty degeneration of the liver and heart muscle. It was possible to recover the organism from the bone-marrow as well as from the lesions. From the transmission experiments and cultural examinations, G. concludes that the organism was *Clostridium septique*.—J. A. NICHOLSON.

IYER, P. R. K. (1936). **An Unusual Case of Epizootic Lymphangitis in a Mule.** —*Indian J. vet. Sci.* **6.** 251-260. 7 figs. on 3 plates. [Numerous refs.]

This is a clinical and laboratory record of a case of E. L. in a mule, the lesions being confined to the intestines and the mesenteric glands. Owing to the absence of any cutaneous manifestation, the condition remained undiagnosed during life. The author reviews the relevant literature on atypical forms of this disease. He considers that ingestion must have been the route of infection in this case, and that the other recorded atypical forms of the disease indicate infection *per os* as one of the channels open to the causal agent. The histopathology of the lesions is given in detail.—C. DAVENPORT.

WILLIAMS, J. W. (1936). **Invasiveness of Skin Infections Caused by Pathogenic Fungi and Subsurface Mycelium.**—*Science.* **83.** 396-397.

This is a preliminary study of the power of invasive growth shown by pathogenic fungi in solid culture media. It was undertaken with a view to throwing light on the factors determining chronicity and invasiveness of pathogenic fungi in skin infections. In the experiments described hydrolyzed pig skin and human hair were incorporated in the media. These were then sown with a variety of fungi both on the surface and in depth. The resulting subsurface growth is described. In subsequent experiments cysteine hydrochloride was substituted as the source of nitrogen and with this also predominantly subsurface growths were obtained.—C. DAVENPORT.

DISEASES CAUSED BY PROTOZOAN PARASITES.

BEVAN, L. E. W. (1936). **The Tsetse-Fly Disease.**—*Rhod. agric. J.* **33.** 746-769. 6 text figs., 20 figs. on 1 plate.

This paper is a semi-popular account of the problem of trypanosomiasis in Rhodesia. As a rule an equilibrium becomes established between the " fly " trypanosomes and their natural hosts, but when susceptible hosts are moved into a tsetse area, or when a different strain of trypanosome is introduced by a " carrier ", disease results. From the records of early travellers, it appears that two-thirds of Southern Rhodesia was infested or menaced by tsetse fly but, after the rinderpest epizootic of 1896, for some unknown reason, the fly disappeared from all but a few small areas which have been designated " survival areas ". From these the fly overflowed during the next 40 years till it infested some 20,000 square miles of its pre-rinderpest habitat, with a consequent spread of trypanosomiasis. It has been suggested that animal disease may be spread mechanically by flies other than tsetse, but no proof of this has been obtained in Rhodesia, and when cattle on a farm are dying of trypanosomiasis it is wise to suspect that tsetse are present, even though this cannot always be proved.

An investigation into the species of trypanosomes concerned showed that *Tryp. brucei*, *Tryp. vivax* and a small trypanosome, resembling *Tryp. congolense* but not identical with it, were present. The small species was named *Tryp. pecorum*. In 1909, a human trypanosome, *Tryp. rhodesiense*, was detected and 56 cases of this infection have since been recorded. The relationship of the human trypanosome to *Tryp. brucei* is discussed, and it is pointed out that cases of tolerant natives have been detected in the old " survival areas " and that these probably form the reservoir of the human organism. The human disease is rare and is probably transmitted by *Glossina morsitans* from man to man, and not from game to man.

It is suggested that the elimination of tsetse fly is a remote event, and that a method of immunization would be valuable in the meantime. There is some indication that tolerance might be produced [*V. B.* **7.** 5.] but tolerant animals are carriers, and a method of conferring sterile immunity is required.

Periodic treatment with potassium antimonyl tartrate will enable cattle to be maintained in a fly belt, but the work entailed in the process is considerable. Attempts to produce immunity by infecting with a standard strain of trypanosome followed by treatment with antimony were fairly successful, but when exposed in the " fly belts " the animals developed *Tryp. vivax* infection, gall sickness and nutritional disease. Response to treatment was most marked at the period when the trypanosomes were most numerous in the blood, and success seemed largely

to depend on the timing of treatment. " Antimosan " has the advantage that it can be administered subcutaneously, but it is too expensive. An extensive trial of " surfen C " has not proved its efficiency against the small trypanosome of Rhodesia, although it has been reported to be effective in the treatment of *Tryp. congolense* infection. The need for the continued, vigorous prosecution of research is urged [*V. B.* **7.** 271].—U. F. RICHARDSON.

MANRESA, M., & GONZALEZ, B. M. (1936). **Studies on Surra : IV. Variability in Size of the Trypanosomes and Density of Infection, Natural and Acquired Immunity.**—*Philipp. Agric.* **24.** 716-751. 6 tables, 3 charts. [17 refs.] [See also *V. B.* **6.** 501].

A résumé of experiments on surra in the Philippines. The size of the trypanosome appears to be affected by the host. Trypanosomes of bovine origin, when injected into rats and horses, rapidly increase in size. The following measurements are given :– in cows 18·3μ, in water buffaloes 19·8μ, in rats 25·6μ and in horses 27·3μ. The number of trypanosomes found in the blood stream in recently infected animals appeared to bear a direct relation to the degree of susceptibility, the horse being the most susceptible, followed by the ox and the buffalo. Intra-uterine infection was not met with. No trypanosomes were isolated from the milk of infected cows, and experiments indicated that calves sucking such cows do not become infected. Fifty-four cases of definite recovery in cattle and water buffaloes occurred as determined by microscopic blood examinations, complement-fixation tests and animal inoculations. Eight cows and three water-buffaloes which had recovered from surra were actively immune to further experimental infection. The complement-fixation test is a useful aid in surra control, but must be checked by animal inoculations.—R. FISHER.

BROWNING, C. H., & GULBRANSEN, R. (1936). **Immunity following Cure of Experimental *Trypanosoma brucei* Infection by a Chemotherapeutic Agent.** —*J. Path. Bact.* **43.** 479-486. 1 table. [19 refs.]

The degree of active immunity which develops in mice injected with *Tryp. brucei* and cured by a single dose of a rapidly excreted drug depended markedly on the strain of trypanosome. Rabbits, cured of infection with strains of *Tryp. brucei* which did not confer complete protection in the mice, possessed a high degree of resistance to reinoculation with the homologous strain. The serum of immune rabbits exerted some protective action, as shown when it was added to living trypanosomes of the homologous strain and the mixture was injected into mice.—J. M. ROBSON.

SCHILLING, C. (1936). **Immunization against Trypanosomiasis, 3rd Contribution.** —*J. trop. Med.* (*Hyg.*). **39.** 221-222. [See also *V. B.* **5.** 122 and 618].

S. records later information as to the results of exposing to tsetse infection calves which he had attempted to immunize against trypanosomiasis. Out of 12 control calves, three survived. Out of ten calves vaccinated with the dried blood of rats infected with *Tryp. brucei* and *Tryp. congolense*, four survived. Out of 17 calves immunized by the injection of minimal doses of trypanosomes, eight survived. The animals were exposed to tsetse in June, 1934, and no deaths had occurred since July, 1935.—U. F. RICHARDSON.

KASANSKY, I. I. (1936). Materiali k izučeniju filtruemosti tripanozom. [**Filtrability of Trypanosomes**].—*Rev. Microbiol., Saratov.* **15.** 67-72. 1 table. [15 refs.] [German summary].

Using several types of bacterial filters and employing positive and negative pressures, K. found that *Tryp. equiperdum* and *Tryp. ninae Kohl-Yakimov*, were not filtrable.

SUDZILOVSKIJ, M. N., & SĆERBININ, I. V. (1936). Geografičeskoe rasprostranenie piroplasm i kleśćej-perenosčikov piroplasmoza krupnogo rogatovo skota i lošadej b SSSR. [**Geographical Incidence of Piroplasmosis. Vectors of Bovine and Equine Piroplasmosis in White Ruthenia, U.S.S.R.**]—*Uchen. Zap. Vitebsk vet. zoo. Inst.* **4.** 123-130.

Bovine piroplasmosis was found in association with *Ixodes ricinus* throughout White Ruthenia and equine piroplasmosis with *Dermacentor marginatus* in the southern part. The species identified were "*Babesiella bovis*", "*Francaiella occidentalis*" and *B. caballi*. *B. equi* was not found. *D. marginatus* was present in the northern districts but there was no piroplasmosis in horses.

I. SIMONATTI, E. (1936). Il cosi detto "pisciasangue" nei bovini della Valtellina. [**Bovine Piroplasmosis at Valtellina, Italy**].—*Profilassi.* **9.** 110-112. [7 refs.]

II. PICO, R. (1936). Piroplasmosi ed ematuria. [**Bovine Piroplasmosis in Italy**].—*Clin. vet., Milano.* **59.** 336-338. 2 figs.

I. S. has shown that the haematuria affecting cattle in the early spring at Valtellina is due to *Babesia bovis*, and not to the ingestion of poisonous plants, as is commonly supposed.

II. P. records that bovine piroplasmosis occurs at a height of from 800 to 1,000 m. above sea level and has demonstrated the presence of *Ixodes ricinus* on the pastures.—J. A. NICHOLSON.

GAUCHOT, G. (1936). De l'étiologie et du traitement de l'ictère infectieux des muletons. [**Aetiology and Treatment of Nuttallia Infection of Mules**].—*Thesis, Lyons.* pp. 60. [Numerous refs.]

Infectious jaundice is the name employed for a disease of mules occurring in the Basses-Alpes department, France, the causal agent of which has been shown to be *Babesia equi*. Mortality is highest in young animals in the first months after birth. G. produces evidence to show that infection is by the placental route and this he believes to be the normal route of infection in the disease. He used "atoxyl" for both prophylactic and curative purposes in preference to all other drugs. In the former case injections were made into the mare during the last two months of pregnancy. The dose used as a curative was 0·5 g. injected subcutaneously. This was repeated where necessary 24 and 48 hours later; 40% of cures only is claimed. The article includes clinical records of the action of this drug in both its prophylactic and curative roles.—C. DAVENPORT.

DONATIEN, A., LESTOQUARD, F., & KILCHER-MAUCOURT, A. (1934). Passage à travers le placenta de "Babesiella ovis" et de "Anaplasma ovis". [**Placental Transmission of *Babesia ovis* and *A. ovis***].—*Algérie méd.* **38.** 320-321.

The authors carried out hysterectomy on two pregnant ewes exhibiting a heavy infection of the peripheral circulation with *B. ovis* and *A. ovis*. Before the operation an injection of pigment was made intravenously. On examination, the foetuses were found to be free from any visible pathological lesions or pigmentation, but the parasites were demonstrated without difficulty in the heart blood of both.—C. DAVENPORT.

DISEASES CAUSED BY VIRUSES.

GALLOWAY, I. A., & ELFORD, W. J. (1936). **The Size of the Virus of Rabies ("Fixed" Strain) by Ultrafiltration Analysis.**—*J. Hyg., Camb.* **36.** 532-535. 1 table. [11 refs.]

This is determined by the use of graded collodion membranes [*V. B.* **3.** 242]. The filtration end-point is found to be $0{\cdot}2\mu$, and the diameter of the virus of rabies is calculated as 100 to $150m\mu$. It is shown that, during the process of ultrafiltration, the titre of the virus diminishes from 10^{-4} to 10^{-1}. The virus adheres to the cellular debris, and difficulty is experienced in separating it from this material.
—E. C. HULSE.

OLITSKY, P. K., SABIN, A. B., & COX, H. R. (1936). **An Acquired Resistance of Growing Animals to Certain Neurotropic Viruses in the Absence of Humoral Antibodies or Previous Exposure to Infection.**—*J. exp. Med.* **64.** 723-737. 9 tables. [13 refs.]

A series of mice of varying ages (14 days to one year) was injected by different routes with falling dilutions of vesicular stomatitis virus. No appreciable difference in the mortality rate was noted when virus was given intracerebrally but, when introduced by the intranasal, subcutaneous and intramuscular routes, the young mice were much more susceptible than the older animals. This resistance was not due to the presence of antiviral bodies in the serum of the latter group.

In the case of other viruses, some slight age immunity was detected with western equine encephalitis virus in mice, but with the eastern type in mice, Aujeszky's disease virus in g. pigs and poliomyelitis virus in monkeys, no increased resistance with age was noted.

It is suggested that this immunity to vesicular stomatitis was not due to exposure to infection at an early age, but is an example of a limited resistance developing in some animals with increasing age and operative only when the virus is introduced by certain routes.—R. E. GLOVER.

BURNET, F. M. (1936). **Observations on the Effect of Louping Ill Virus on the Developing Egg.**—*Brit. J. exp. Path.* **17.** 294-301. 6 tables. [3 refs.]

B. describes the lesions produced by "louping ill" virus in the chorio-allantoic membrane and in the embryo of the developing egg. In nearly all experiments, inoculations were made with membrane filtrates prepared from mouse brains. The nature of the pathological changes was ascertained by studying eggs inoculated at various stages of incubation. All the eggs were opened three days after inoculation. In ten-day eggs there was considerable oedema of the chorio-allantois and also bands of cellular opacity, but there were no specific focal lesions. In 12-day eggs there was only moderate oedema, but specific foci occurring as small (0·2 to 0·3 mm.) white opaque spots were thickly scattered over the membrane. The lesions produced in eggs inoculated at 13 days showed some resemblance to 12-day egg lesions, while inoculations made on the 14th day had very little effect.

Histologically, the focal opacities were represented by a spindle-shaped thickening of the ectodermal layer with a small region of necrosis at the centre of the lesion. By the third day active necrosis had ceased and a fibroblastic reaction was in evidence. The embryos of eggs usually die on the sixth day after inoculation and at about this time characteristic visceral lesions are noticed. The blood vessels of the chorio-allantois may be smaller than normal; more rarely they may be distended with blood of an opaque salmon tint of low haemoglobin content and containing mostly immature red blood cells. Every degree of jaundice of the embryo and the other contents of the egg may be encountered. When severe

jaundice is present, the embryo appears smaller than normal, emaciated and anaemic-looking. Changes in the liver are almost always noticeable. White or yellow necrotic patches may involve most of the organ or, if necrotic patches are absent, an abnormal, deep greenish-brown colour is observed. Virus is regularly present in the embryo blood and in the washed blood cells at periods from the second to the sixth days after inoculation.

In comparative titrations of " louping ill " virus in mice and in the developing egg, B. found that the egg membrane was more sensitive to infection than the mouse brain. In view of the constant presence of virus in the blood with attachment to the blood cells and the development of visceral lesions, the almost exclusive viscerotropism of " louping ill " virus in this situation is discussed.—D. R. WILSON.

SIEGERT. (1936). Die Leukose des Rindes, ihr klinisches Bild. **[Clinical Picture of Bovine Leucosis].**—*Berl. tierärztl. Wschr.* **52.** 775-777.

This article deals with leucosis from the point of view of the practitioner, and includes particulars of lymphatic leucaemia, pseudo-leucaemia and lymphosarcomatosis, since it is not possible clinically to differentiate these conditions.

Diagnosis by clinical methods is not possible in the early stage. Lymphatic leucaemia can readily be diagnosed when generalized enlargement of the lymph nodes is present. Myeloid leucaemia cannot be diagnosed clinically.—E. G. WHITE.

I. BURNET, F. M. (1936). **Influenza Virus on the Developing Egg. I. Changes Associated with the Development of an Egg-Passage Strain of Virus.**—*Brit. J. exp. Path.* **17.** 282-293. 1 text fig., 6 figs. on 2 plates, 4 tables. [8 refs.]

II. STUART-HARRIS, C. H. (1936). **The Transmission of Influenza Virus to Hedgehogs.**—*Ibid.* 324-328. 4 figs. on 1 plate, 3 tables. [8 refs.]

I. By the serial passage of human influenza virus through the developing egg, changes occur in the pathogenicity of the virus for the egg. In the initial passages, small foci were visible on the chorio-allantoic membrane. Between the 52nd and the 63rd passages, most chick-embryos were found to be dead on the fourth day after inoculation. At the 63rd passage haemorrhagic encephalitis was noted and, at the 70th there were also muscle haemorrhages. By the 73rd passage, death occurred 48 hours after inoculation.

The egg virus proved to be infective for mice (intranas.), giving rise to mild respiratory lesions ; ferrets, however, were much less susceptible, showing only a slight febrile reaction.

The virus retained its original immunological properties after egg-passage. The histological examination of the membrane lesions revealed proliferation and necrosis of the ectodermal cells, followed by leucocytic migration. No inclusion bodies were demonstrated.

II. When human influenza virus was passaged serially (intranas.) through hedgehogs, a mild disease of the respiratory tract occurred. Mice inoculated with the infected hedgehog material developed lung lesions typical of influenza. At the later passages, hedgehogs showed a nasal discharge and sneezing. Slight reddening of the mucosa of the nasal turbinates was seen, but lung lesions were generally absent. Transmission by contact infection occurred in two instances ; in one case, virus was recovered from the contact animal and, in the second, antibodies were demonstrated in the serum.

Histological examination of the turbinates revealed necrosis of the ciliated epithelium and the production of an exudate of polymorphonuclear leucocytes, and red corpuscles in the lumen. In two hedgehogs, examination of the lung changes showed thickening and vacuolation of the alveolar wall and infiltration by mono-

cytes; similar lesions are seen in infected ferrets. Recovery from the infection was accompanied by the development of antibodies in the blood.—E. C. HULSE.

BURNET, F. M. (1936). **Influenza on the Developing Egg. 2. Titration of Egg Passage by the Pock-Counting Method. 3. The "Neutralization" of Egg Virus by Immune Sera.**—*Aust. J. exp. Biol. med. Sci.* **14.** 241-246 and 247-258. 3 figs., 9 tables. [15 refs.] [See also *V. B.* **7.** 378].

Paper 2 describes a pock-counting technique for titrating "egg passage influenza" virus. The diluted material is sown on to the chorio-allantoic membrane which after incubation develops focal lesions. The number of focal lesions represents the titre. It does not, however, represent the number of actual virus particles, because material too diluted to cause the development of any foci may cause the death of the embryo. The counting of the foci is often complicated by the development of secondary foci which, however, are usually recognizable as such. Higher counts of foci and a smaller minimum lethal dose are obtained with eggs incubated at 36·5°C. than at 39°C.

The interaction between egg-passage influenza virus and ferret and other immune sera were studied with the aid of the pock-counting technique described in the second paper of the series. It was found that the reaction may be divided into two phases, the first and most important being the rapid establishment of equilibrium between virus, antibody and inactivated virus. This phase is almost instantaneous when a relatively high concentration of serum is used, but may occupy ten minutes with lower concentrations of serum. The reaction, during this phase, is reversible and almost complete dissociation is obtained on dilution with inert fluid. It conforms to the ordinary laws of mass action. The theoretical implications of this are discussed. The second phase is much slower and is irreversible.—W. I. B. BEVERIDGE.

GERLACH, F. (1936). Beobachtungen bei der in Oesterreich auftretenden Psittakose. [**Psittacosis in Austria**].—*Wien. tierärztl. Mschr.* **23.** 552-558. [1 ref.]

Tests made in Vienna revealed the presence of psittacosis in budgerigars and canaries and in such native birds as goldfinches, siskins, blackbirds, bullfinches and cross-bills. G. believes that psittacosis in a latent form must have spread to a considerable extent among the native species of birds in Austria. He is very much concerned by the possibility that there are human virus "carriers" and discusses four definite instances in which he discovered such cases after symptomless infection. G. emphasizes the need of some form of artificial immunity against psittacosis.—M. BURKE.

DACHENA, G. (1936). Forme atipiche della stomatite pustolo-contagiosa della capre e degli agnelli. [**Atypical Form of Contagious Pustular Stomatitis in Goats and Lambs**].—*Nuova Vet.* **13.** 265-269. 2 figs.

D. records an outbreak of C. P. S. in goats and lambs which was atypical in that lesions in many cases were discrete and localized to the mammary region. Some animals showed typical lesions on the lips, withers and joints. *Staphylococcus aureus* and *S. albus* were isolated from the lesions, but they proved to be non-pathogenic for rabbits and g. pigs, nor did they set up the disease when scarified on to the lips of experimental sheep. Bacteriological examinations of the bone-marrow, spleen and lungs from infected animals were negative. The disease could be reproduced by scarifying emulsions of the crusts on to the lips of healthy sheep, typical lesions developing in about four days.—J. A. NICHOLSON.

I. GIBBS, C. S. (1935). **Ultrafiltration Experiments with the Viruses of Laryngotracheitis and Coryza of Chickens.**—*J. Bact.* **30.** 411-417. 3 tables. [15 refs.]

II. ELFORD, W. J., & GALLOWAY, I. A. (1936). **The Size of the Virus of Aujeszky's Disease (" Pseudo-Rabies ", " Infectious Bulbar Paralysis ", " Mad-Itch ") by Ultrafiltration Analysis.**—*J. Hyg., Camb.* **36.** 536-539. 2 tables. [13 refs.]

I. The difficulties experienced in obtaining infective filtrates of the viruses of laryngotracheitis and of infectious coryza of chickens have been overcome by adding a solution of citric acid until the iso-electric point for tissue particles is reached, so that the virus suspension can be easily freed from the latter by centrifugation.

Such suspensions pass readily through collodion membranes of the type suggested by ALLISBAUGH and HYDE [*V. B.* **6.** 90]. A series of experiments indicated that the virus of laryngotracheitis is less than 0·082μ in size and that of infectious coryza less than 0·135μ. [The nature of these filters probably does not permit as exact an estimation of the size of viruses as the graded membranes of ELFORD].

II. Infective broth suspensions of brain or lung from rabbits inoculated with Aujeszky's disease virus (Hungarian strain or " mad-itch " strain) were centrifuged, cleared by coarse filtration and then passed through a series of graded " gradocol " membranes. The virus of each strain was found to possess an average pore size of 100 to 150$m\mu$.—R. E. GLOVER.

KIDD, J. G., BEARD, J. W., & ROUS, P. (1936). **Serological Reactions with a Virus Causing Rabbit Papillomas which become Cancerous. II. Tests of the Blood of Animals carrying Various Epithelial Tumours.**—*J. exp. Med.* **64.** 79-96. 3 figs. on 1 plate, 6 tables. [8 refs.] [See also *V. B.* **7.** 180].

The Shope papilloma implanted into domestic rabbits is capable, in a proportion of cases, of inducing cancerous growths. In these experiments, metastatic lesions were transferred to fresh animals whose sera were later tested for antiviral bodies. In one instance, the serum of a rabbit with a large induced carcinoma had a definite neutralizing effect on the virus, while sera from rabbits bearing tar epithelioma or the Brown-Pearce tumour were without effect on the virus, thus showing that epidermal proliferation, as such, was not followed by antibody production.

It was further shown that when a mixture of the Brown-Pearce tumour and the papilloma were implanted together, and the resultant growth later transferred to fresh hosts, no Shope virus antibodies developed.

The authors suggest that the cancers which are derived from these papillomata still contain the virus.—R. E. GLOVER.

LESTOQUARD, F., & DONATIEN, A. (1936). Sur une nouvelle *Rickettsia* du mouton. [**A New *Rickettsia* of Sheep**].—*Bull. Soc. Path. exot.* **29.** 105-108.

In three Algerian sheep and in sheep examined in 1931 in Anatolia a *Rickettsia* was observed which differs from *R. ruminantium* in that it is only slightly pathogenic and is seen only in the blood. The name *R. ovina* is suggested. *Rhipicephalus bursa* appears to be the vector.—J. E.

LEVADITI, C., PAÏC, M., VOET, J., & KRASSNOFF, D. (1936). Ultrafiltrabilité et dimensions probables des bacteriophages. [**Determination of Probable Size of Bacteriophages by Ultrafiltration**].—*C. R. Soc. Biol. Paris.* **122.** 354-358. 5 figs. [8 refs.]

Filtration experiments through graded collodion membranes with bacteriophages active against different organisms showed that the end-point for each type is different (0·02 to 0·05μ up to 0·08 to 0·12μ). These findings support the conception of a plurality of bacteriophages.—R. E. GLOVER.

I. ELFORD, W. J. (1936). **Centrifugation Studies : I. Critical Examination of a New Method as Applied to the Sedimentation of Bacteria, Bacteriophages and Proteins.**—*Brit. J. exp. Path.* **17.** 399-422. 5 figs., 8 tables. [Numerous refs.]

II. ELFORD, W. J., & ANDREWES, C. H. (1936). **Centrifugation Studies : II. The Viruses of Vaccinia, Influenza and Rous Sarcoma.**—*Ibid.* 422-430. 4 tables. [14 refs.]

I. The estimation of the sizes of virus and bacteriophage particles by sedimentation in the ordinary type of bucket centrifuge gives results about 30% higher than those obtained by filtration and ultra-violet light photography. E. has devised an inverted capillary apparatus which can be used with the usual type of high-speed centrifuge. There is a marked reduction in the effects of convection currents, mechanical vibration, undue rises in temperature, etc.

The new technique applied to bacteria, bacteriophages and proteins has yielded the following particle sizes :– *Chromobact. prodigiosum*, 0·7 to 0·8μ ; staphylococcus K phage, 60 to 70 $m\mu$; S.13 phage, 15 to 17 $m\mu$; haemocyanin, 22 $m\mu$; and edestin 8 $m\mu$. These values are extremely close to those furnished by ultrafiltration experiments.

II. The technique described in I was applied to the viruses of vaccinia, influenza and Rous sarcoma. The following table gives the estimated particle sizes compared with the figures obtained from earlier filtration studies :–

VIRUS	PARTICLE DIAMETER IN $m\mu$	
	Centrifugation	Ultrafiltration
Vaccinia	170-180	125-175
Influenza	87-99	80-120
Rous sarcoma	60-70	70-100

—R. E. GLOVER.

PARASITES IN RELATION TO DISEASE (ARTHROPODS).

FRIELING, H. (1936). Die Feder. [**Feathers**].—*Kleintier u. Pelztier.* **12.** No. 2. pp. 60. 43 figs., 1 table, 1 appendix. [Numerous refs.]

This monograph deals chiefly with pure biology, but has a short chapter on the arthropod parasites found in the feathers of birds of all kinds.

Bird lice belong to the Mallophaga and the various species of lice are specific for the different genera of birds. There are many species of feather mites and they are very common bird parasites. A classified list with hosts is given in an appendix.

Those parasitic on domestic poultry include *Physconelloides* sp. (pigeon), *Columbicola* sp. (pigeon, duck), *Pterocotes* sp. (fowl, pigeon), *Lipeurus* sp. (fowl), *Lagopoecus* sp. (fowl), *Neocolpocephalum* sp. (pigeon), *Eomenacanthus* sp. (fowl), *Uchida* sp. (fowl), *Holomenopon* sp. (duck), and *Menopon* sp. (duck).—J. E.

KOPEK, I. (1936). Meddig bírja a koplalást az Argas persicus ? [**Viability of *A. p.* when Fasting**].—*Állatorv. Lapok.* **59.** 367-368.

K. placed about 436 specimens of *A. p.*, attached to a piece of an old tile from an infested building, in a glass bottle, the mouth of which he covered with white paper. After two years and 30 days without food, 212 (about 50%) of the

specimens remained alive. At the end of five years and seven weeks about 12 specimens were still alive.

CAPRUN, A. A. (1935). Biologija polostnogo ovoda verbljudov-*Cephalopsis titillator* Cl. [**Biology of the Camel Gad-fly**].—*Trud. vsesojuz. Inst. eksp. Vet.* **11.** 136-151. 8 tables. [16 refs.] [French summary].

C. studied the biology of the camel gad-fly in Kazakstan (eastern U.S.S.R.). He gives a minute description of the egg, larva, pupa and adult.

I. OBITZ, K. (1936). Nasilenie i rozmieszczenie gza bydlęcego (Hypoderma sp.) w Polsce. [**The Ox Warble Fly in Poland**].—*Wiad. weteryn.* **18.** 415-426. 1 table, 1 chart, 5 maps. [6 refs.] [English summary].

II. STEFANSKI, W., & OBITZ, K. (1936). Przyczynek do zagadnienia organizacji zwalczania gaz bydlecego (Hypoderma sp.) w Polsce. [**A Control Scheme for Ox Warbles in Poland**].—*Ibid.* 427-432. 1 fig. [3 refs.] [French summary].

I. Data are given that were obtained from questionnaires issued by the Polish Ministry of Agriculture.

II. S. and O. demonstrated the use of derris powder and the method of extracting warble-fly larvae from oxen by means of hooks. They advise propaganda, and compulsory adoption of the method.

DUMITRU, I. (1936). Un caz rar de Cephalomiază ovina. [*Cephalomyia ovis* **Infestation in a Sheep**].—*Rev. Med. vet., Bucaresti.* **48.** 208-213. 3 figs.

This fly is very prevalent in Rumania, more particularly in Bessarabia. Nasal bot infestation does not usually cause much trouble. D. describes in detail a fatal case which he observed.

RAO, M. A. N., & PILLAY, M. R. (1936). **Some Notes on Cutaneous Myiasis in Animals in the Madras Presidency.**—*Indian J. vet. Sci.* **6.** 261-265. 4 tables. [1 ref.]

R. and P. obtained larvae from 404 cases of fly-blown sores in domesticated animals, including fowls, in various districts of the Madras Presidency. On examination 401 of these proved to be *Chrysomyia bezziana* and the other three *Lucilia argyricephala.* Subsequent experiments showed that the former parasite when present in wounds is purely obligatory, whereas the other breeds easily in dead meat. From the information obtained the authors prepared tables showing the seasonal prevalence of these flies in the Presidency and the areas in which they are found to abound.—C. DAVENPORT.

MACKERRAS, I. M., FULLER, M. E., & AUSTIN, K. M. (1936). **Sheep Blowfly Investigations. The Effect of Trapping on the Incidence of Strike in Sheep.** —*J. Coun. sci. industr. Res. Aust.* **9.** 153-162. 2 figs., 2 tables.

Experiments on two widely separated properties are described. In both cases the general plan was the same, namely, two areas were chosen, as similar as possible and as widely separated as possible on the property. They were equally grazed by selected similar sheep. One area was intensively trapped, special attention being paid to trapping the boundaries in order to reduce possible invasion by flies from untrapped neighbouring areas. The other area was not trapped. The incidence of fly strike of sheep in each area was recorded. Two experiments were repeated, the selected areas being reversed so that the previously trapped area was untrapped, and *vice versa.* It was demonstrated that trapping reduced the

incidence of fly-strike by over 50%. Trapping was carried out on a much more intensive scale than that usually adopted so that the experiments did not indicate whether such trapping was a sound economical method for general sheep husbandry. It is pointed out that, in general, present methods of trapping are far from perfect and it is considered that the results obtained fully justified further attempts to improve the efficiency of traps and baits and studies of the conditions under which they may be most effectively used.—H. McL. Gordon.

Seddon, H. R. (1936). **The Case against " C " Class Sheep.**—*Agric. Gaz. N.S.W.* **47.** 65-67. 2 figs., 1 table.

S. briefly recapitulates previously published observations which demonstrated that sheep with very wrinkly breeches (" C Class ") are much more prone to fly strike than are sheep with plain crutches (" A Class "). More recently obtained data suggest that the value of wool from " C Class " sheep is not as great as that from plain sheep. The " C Class " sheep are more susceptible to wounding during shearing and hence to bacterial infections. Furthermore, " C Class " sheep reared fewer lambs than did plain sheep, this discrepancy probably being the indirect result of greater fly strike incidence in the former during mating and subsequent to lambing. In view of this evidence it is suggested that " C Class " sheep should be rejected from the flock.—W. I. B. Beveridge.

McCulloch, R. N., Howe, K. R., & Hockley, J. (1936). **Jetting and Crutching for the Control of Blowfly Strike.**—*Agric. Gaz. N.S.W.* **47.** 486-490. 2 figs., 2 tables. [5 refs.]

An experiment was conducted to ascertain the value, for controlling blowfly strike in breeding ewes, by means of two jettings at an interval of five weeks between November, 1935 and May, 1936, as compared with hand-dressing or crutching. There were three groups each of 255 sheep: the first was jetted, the second crutched and the third untreated. Ca arsenite jetting mixture was used. During the year 42 strikes were treated in the jetted group, 95 in the crutched group and 254 in the controls. Spring crutching and frequent hand-dressing each reduced the average value of breech wool by 1.4d. per sheep. Thus, for the control of strike only, repeated jetting proved to be the most economical treatment.

The jetted ewes reared 39% of lambs as compared with 53% and 46% in the other groups. If the jetting reduced the lambing percentage, it seems probable that it was the treatment during mating rather than that during lambing which was responsible.

The average wool production of the jetted sheep was 12 oz. greater than that of the other groups. Jetting was also associated with a reduction in the number of deaths from strike and in the number of " tender " fleeces. It caused no injury to the wool.—W. I. B. Beveridge.

Brown, A. W. A. (1936). **Miscellaneous Physiological Observations on the Laboratory Breeding of Flesh Flies and of *Melanoplus bivittatus* Say.**—*Canad. Ent.* **68.** 88-91. [6 refs.]

B. collects the exuviae of the larvae of *Wohlfahrtia vigil*, *Calliphora erythrocephala* and *Lucilia sericata* on porcelain plates to aid observation. It is possible for meat to be too putrescent for their growth. Pupation requires darkness, humidity and a temperature of 20° to 30°C. Delayed pupation produces small adult flies. Pathological conditions at pupation may be caused by too dry a condition, resulting in no development, or no emergence, owing to excessive hardness. Pupation at 28°C., with 70% of relative humidity, produces a high proportion of

monsters; the duration of the larval and pupal periods is, however, greatly reduced.—T. W. M. CAMERON.

PARASITES IN RELATION TO DISEASE (HELMINTHS).

ANON. (1936). Om bekjempelse av parasittaere sykdommer hos småfe i saerlig hjemsøkte distrikter. [**Control of Parasitic Diseases of Sheep and Goats in Badly Affected Districts**].—*Norsk VetTidsskr.* **48.** 509-511.

This paper is an official communication to the veterinary officials from the Chief Veterinary Director, appealing to them to take up the control of parasitic diseases in sheep and goats (especially distomatosis) and permitting them when doing so to travel at the public expense and to recover fees from public funds.
—GUSTAV NAERLAND (OSLO).

ROBERTS, F. H. S. (1936). **Distribution of the Gastro-Intestinal Parasites of Sheep in Queensland.**—*Pamphl. Dep. Agric. Qd.* No. 8. pp. 8. 2 tables, 1 map. [10 refs.]

A summary of the distribution of the gastro-intestinal parasites of sheep in Queensland has shown that rainfall is the chief controlling factor. A table shows the monthly rainfall for different areas. *Haemonchus contortus* was found to be the most frequent and wide-spread helminth parasite of sheep. It attained its maximum incidence in areas having a rainfall of 20 inches or over per annum, especially where the rainfall is distributed throughout the year. *Ostertagia circumcincta*, *O. trifurcata* and *O. ostertagi* were also found in sheep. *O. circumcincta* was the commonest species, found in greatest numbers in the south-eastern portion of the state (Stanthorpe). *O. trifurcata* was rare and *O. ostertagi* was recorded twice. The latter is a very common cattle parasite. Six species of *Trichostrongylus* were recorded, namely, *T. colubriformis*, *T. rugatus*, *T. vitrinus*, *T. axei*, *T. probolurus* and *T. falculatus*. *T. colubriformis* is the commonest species and in the Darling Downs area has been responsible for serious outbreaks of trichostrongylosis. The other species appear to be fairly wide-spread, but do not occur in large numbers. It is suggested that *T. axei* and *T. vitrinus* reach their highest development in temperate climates and that the distribution of *T. colubriformis* indicates a very resistant and very adaptable free-living life-cycle.

Cooperia curticei was frequently observed in the Darling Downs area, but only in small numbers. *C. oncophora* was rare and was found in association with *C. curticei*. *C. punctata* and *C. pectinata* were widely distributed, but were rare in sheep. They are common cattle parasites. *Nematodirus filicollis* and *N. spathiger* were commonest in the south and south-west; only small numbers were found. *Bunostomum trigonocephalum* was recorded on one occasion, from the north coast. *Moniezia expansa* was wide-spread, but commonest in the south and central west, where the rainfall is higher. *Helictometra giardi* is similarly distributed but is not as common as *Moniezia expansa*.

Oesophagostomum columbianum is widely distributed, reaching its greatest intensity of infestation on the Darling Downs and in the higher rainfall areas of the central west. *O. columbianum* has apparently the same climatic distribution as *Haemonchus contortus*, but its absence in the far west and north-west indicates that the free-living stages are not so resistant to high temperatures and prolonged dry conditions. *O. venulosum* was recorded from the south-western section of the Darling Downs. *Chabertia ovina* was not encountered, but its presence has been recorded by other authors from the area where *O. venulosum* was found. *Trichuris*

ovis was comparatively uncommon and was absent from the far west and north west.—H. McL. Gordon.

Babić, I. (1936). Entoparaziti ptica zapadnog dijela drzave. [**Helminth Parasites of Birds in Western Yugoslavia**].—*Vet. Arhiv.* **6.** 297-302. [Numerous refs.] [German summary].

A list is given of helminth parasites found by B. in domesticated and wild birds in western Yugoslavia. The original must be consulted for details.

—B. Oswald (Skoplje).

LaRue, G. R., & Fallis, A. M. (1936). **Morphological Study of** *Alaria canis* **n. sp. (Trematoda : Alariidae), a Trematode Parasite of the Dog.**—*Trans. Amer. micr. Soc.* **55.** 340-351. 16 figs., 2 tables. [7 refs.]

The authors describe, from several specimens recovered after anthelmintic treatment of a Newfoundland dog in northern Ontario, what is considered to be a new species of *Alaria*. It is distinguished from previously known species by several differences in size which are considered to be of specific significance.

—E. L. Taylor.

Tenhaeff, C., & Ferwerda, S. (1936). De echinococcosis bij de huisdieren. [**Echinococcosis of Domestic Animals**].—*Tijdschr. Diergeneesk.* **63.** 847-856 and 919-924. 2 tables, 1 graph. [19 refs.] [French summary].

The authors give statistics, based on meat inspection returns, of echinococcosis in domestic animals in Friesland from 1924 to 1934. A steady decrease has occurred. About 12% of dogs in Friesland are infested with *Taenia echinococcus*. In cattle, hydatid cysts are usually in the lung, and in horses and pigs usually in the liver.—M. J. J. Houthuis (Rotterdam).

Barnett, L. (1937). **Hydatid Disease. Prevalence and Prevention.**—*N.Z. med. J.* **36.** 105-117. [Numerous refs.]

A comprehensive paper on the prevalence of hydatids in human beings and animals in New Zealand. During the past few years the average admission into hospitals per annum has been 104, out of a population of 1,500,000. B. draws attention to the necessity for control and outlines a compulsory scheme of sterilization of offal fed to sheep-dogs, and the regular administration of arecoline hydrobromide, which should be distributed to dog-owners when the dog is licensed each year. This would not only save human life, but would result in a greater export of sheep's livers from the Export Freezing Works.—C. S. M. Hopkirk.

I. Vergeer, T. (1935). **The Eggs and the Coracidia of** *Diphyllobothrium latum*.—*Pap. Mich. Acad. Sci.* **21.** 715-726. 6 figs. on 1 plate, 1 table. [15 refs.]

II. Tarassov, V. A. (1936). Expérience acquise par cinq années d'études sur les bothriocéphales dans la partie nord-est de l'U.R.S.S. (1931-1935). [*Bothriocephalus* **in North-East U.S.S.R.**]—*Ann. Parasit. hum. comp.* **14.** 472-484. 3 figs., 5 tables. [6 refs.]

III. Thompson, J. E. (1936). **Some Observations on the European Broad Fish Tapeworm Diphyllobothrium latum.**—*J. Amer. vet. med. Ass.* **89.** 77-86. 4 figs. [9 refs.]

IV. Mueller, J. F. (1936). **Comparative Studies on Certain Species of** *Diphyllobothrium*.—*J. Parasit.* **22.** 471-478. 21 figs. [6 refs.]

I. Vergeer examined large numbers of eggs of various species of *Diphyllobothrium*, and found their size to be so variable as to render it of no value for specific determination. Observations on the biology showed that a much greater proportion of eggs hatch from well-developed tapeworms than from poorly developed worms; that the length of life of the coracidium is about two days at 70°F. up to nine days at 48° to 52°F. and that the eggs retain their viability for at least three and a half years at near freezing point.

II. T. briefly describes several interesting observations on *Diphyllobothrium* infestation in a part of the U.S.S.R. where the incidence in human beings was found to reach 78·2% of the population. Dogs, cats and also pigs were found to be serving as definite hosts.

III. It has been thought that dogs keep the infestation of *D. latum* alive in the lakes round Ely, Minnesota, but T.'s observations on the effluent from the Imhoff tank of the sewage plant of that city show that some eggs of the parasite pass through it and so reach the rivers and lakes. He suggests that the sewage disposal system, by conducting sewage rapidly to the rivers, may be assisting the spread of this parasite, rather than hindering it, and that the presence or absence of these eggs should be used as an additional index in judging the efficiency of such plants.

IV. Doubt has been thrown on the validity of *D. mansonoides* described by M. in 1935, it having been suggested that it is a synonym of *D. mansoni*. M. here reports on a comparative study which he has made and he reaffirms his previous conclusions that the species which he found in cats shows specific differences from *D. mansoni*.—E. L. Taylor.

Debelić, Š. (1936). Cisticerkoza i trihinoza kod zaklanih svinja. [**Cysticercosis and Trichinosis of Swine in Yugoslavia**].—*Vet. Arhiv.* **6.** 410-416. 4 tables. [5 refs.] [German summary].

Cysticercosis of swine is rather frequent in Yugoslavia, especially in the southern regions. In the abattoir at Zagreb, it was found in 0·3% of pigs during the past nine years, and a considerable amount of meat was rejected on this account. Trichinosis was observed in 12 cases during the past four years (a percentage of 0·004).—B. Oswald (Skoplje).

Chandler, A. C. (1936). **Studies on the Nature of Immunity to Intestinal Helminths. IV. The Inter-Relations between Prenatal and Intestinal Immunity in Rats Infected with Nippostrongylus.**—*Amer. J. Hyg.* **24.** 129-144. 6 tables. [13 refs.] [See also *V. B.* **6.** 717].

C. gave intraperitoneal injections of vaccines of *Nippostrongylus* to test rats which were afterwards exposed to infection. The vaccines consisted of a suspension of dried and powdered worms and, of the two vaccines used, one prepared from adult and larval worms killed in 3% H_2O_2 and the other from worms killed in saturated salt solution, the latter proved to be the better. The ingestion of dead adult worms and larvae produced no demonstrable effect upon the cause of subsequent infections. Adult worms transplanted into the peritoneal cavity are more quickly disintegrated in rats, which have been previously infected in the normal way, than in uninfected rats, or in rats experimentally infected by transplanting adult worms into the intestine. This suggests that the immune reaction in the peritoneal cavity is a result of the migration of the infecting larvae through it on their way to the intestine and not a result of the presence of worms in the lumen of the bowel.

The experiments are thought to indicate that this parasite produces a local immunity in the intestine which does not become general, but that the immunity produced intraperitoneally, as by the natural migration of the larvae through it, or by inoculation of vaccines, is general or, at least, that it spreads from there to the intestine.—E. L. TAYLOR.

ARTJUCH, E. S. (1936). Orasprostranenii trichocefala ovec v SSSR i sposobe fiksacii ego. [*Trichocephalus* **in Sheep in the U.S.S.R.**]—*Uchen. Zap. Vitebsk vet. zoo. Inst.* **4.** 107-114. 3 figs., 1 table. [14 refs.] [German summary].

Two species of *Trichocephalus* have been found in sheep in the U.S.S.R., up to the present, *Tr. ovis* and *Tr. skrjabini*. The former is described in great detail together with its effect on the host.

I. BAYLIS, H. A. (1936). **On the Nomenclature and Synonymy of the Nematode "*Setaria labiato-papillosa*".**—*Ann. trop. Med. Parasit.* **30.** 293-298. [Numerous refs.]

II. POISSON, H., & BUCK, G. (1936). Note à propos de Setaria labiato-papillosa. [**Note on** *S. l.-p.*]—*Bull. Soc. Path. exot.* **29.** 933-934.

I. B. discusses the question fully and is led to the conclusion that, according to the International Rules of Zoological Nomenclature, the proper name for this parasite is probably *S. cervi* (Rud., 1819). A list of 23 synonyms, thought to be complete, is appended.

II. As a rule, this parasite is regarded as harmless. One previous author, however, has reported peritonitis and acute diarrhoea associated with a heavy infestation. P. and B. here report a similar instance, in which 100 or so of the worms were found in the peritoneal coat of the abdominal cavity of a zebu cow which had shown a persistent chronic enteritis. In another zebu cow a specimen of the same worm was found in the heart, and it is thought that in accidental situations *S. labiato-papillosa* may be distinctly harmful.—E. L. TAYLOR.

KAUZAL, G. (1936). **Further Studies on the Pathogenic Importance of Chabertia Ovina.**—*Aust. vet. J.* **12.** 107-110. [1 ref.]

Previous findings that *C. ovina* may lead to serious intestinal derangement and interference with growth were confirmed. In the case of daily infestations, with small numbers of larvae over a long period, the severity of the symptoms was not proportional to the rate of infestation. Evidence was obtained that the immature worms ingest considerable quantities of blood. Effects which would probably have proved fatal were induced only in one case, where a heavy infestation with *C. ovina* was superimposed on a pre-existing infestation with *Trichostrongylus* spp. It was not found possible to set up other than light and transient infestations with the adult parasite, and factors other than those controlled in the experiments appear necessary for the establishment of heavy infestations with the adult worms. The specific effects of the mature parasites have, therefore, not been studied.
—H. McL. GORDON.

AFRICA, C. M., REFUERZO, P. G., & GARCIA, E. Y. (1936). **Observations on the Life Cycle of Gnathostoma Spinigerum.**—*Philipp. J. Sci.* **59.** 513-523. 7 figs. on 3 plates, 1 table. [15 refs.]

Previous work on the life-history of this parasite has shown that the larvae are capable of infecting some species of *Cyclops*. The authors have found encysted gnathostoma larvae in three species of fresh-water fish, *Glossogobius giurus*, *Ophio-*

cephalus striatus and *Therapon argenteus*. On feeding these larvae to white rats, infection was found to result, and larvae were recovered from the liver and skeletal muscles that appeared to have undergone some development. It is thought probable that development in fish is one of the links connecting the larval gnathostomes found in *Cyclops* with the adults found in mammals.—E. L. TAYLOR.

IMMUNITY.

BULL, L. B. (1936). **The Standardization of Tuberculin for Use in Animal Practice.**—*Aust. vet. J.* **12.** 168-175. [15 refs.]

B. reviews methods of preparing and standardizing tuberculin. Tuberculin contains skin-reacting factors and lethal factors which are not strictly identical, and most probably other intermediate substances which possess both properties. Old tuberculin also contains non-specific substances which will cause some degree of local reaction following intradermal inoculation in animals free from tuberculosis. The two common methods of standardizing tuberculin are the lethal or subcutaneous method and the intradermal method, the complement-fixation and precipitin methods not meeting with general approval.

If tuberculin is to be used for intradermal testing it should be standardized by the intradermal method in g. pigs, whereas if it is required for subcutaneous testing it should be standardized according to the lethal test in g. pigs, and the method of standardization should be stated on the label. Purification and concentration of tuberculin by ultrafiltration or by precipitation with ammonium sulphate may give rise to a less stable product. Glycerinated broth may prove useful in counteracting this lack of stability.—W. I. B. BEVERIDGE.

SANDOR, G. (1936). Problème physico-chimique de la tuberculine. **[The Physico-Chemical Nature of Tuberculin].**—*Ann. Inst. Pasteur.* **57.** 565-582. 7 tables. [18 refs.]

While there can be no doubt that there is an intimate association between tuberculin activity and certain protein substances, the chemical nature of tuberculin is not thereby necessarily established. In the experiments described in this article, an unheated, filtered tuberculin in a synthetic medium was treated by three different methods, *viz* (a) saturation with ammonium sulphate; (b) precipitation with trichloracetic acid, and (c) precipitation by phosphotungstic acid in the presence of sulphuric acid [*V. B.* **6.** 661]. It was found that the trichloracetic acid process completely denatured the protein but did not materially affect the tuberculin activity, although there was an incomplete recovery of active principle, while ammonium sulphate, which has a low denaturing effect, under certain circumstances inactivated a part of the specific principle.

The phosphotungstic acid method, which is favoured by S., is said to precipitate the whole of the active substances without any loss in activity.

The effect of dialysis on tuberculin protein, and the absorption of the specific substance on the lipoid fractions (alcohol and ether soluble; acetone insoluble) are also discussed.—R. E. GLOVER.

I. HENRY, M. (1936). **The Application of the Tuberculin Test.**—*Aust. vet. J.* **12.** 175-177. 1 table.

II. SYMONDS, S. L. (1936). **Notes on the Application of the Tuberculin Test to Dairy Cows in a Small Area.**—*Ibid.* 178-185. 1 table. [2 refs.]

I. The disadvantages of the subcutaneous tuberculin test are :– (1) numerous visits must be paid to each cow or herd unless the veterinarian spends 24 hours on the property ; (2) clinical influences and maltreatment, unless guarded against, may cause thermal fluctuations, and (3) the high temperatures normally recorded by very young animals. On the other hand, the disadvantage of the intradermal test is that the results and interpretation of the test depend so much on the skill and ability of the operator. The claim that the intradermal test is more convenient does not hold when the operator has to travel long distances to the herd and the test has to be completed during the one visit. In 84 reactors to the subcutaneous test there were 2 " no lesion " reactors, while in 77 reactors to the intradermal test there were 5 " no lesion " cases. Of these 7 " no lesion " reactors, 3 were subjected to ordinary abattoir inspection and this is not considered sufficient. In the subcutaneous test, post-injection temperature-taking should commence well before the 12th hour and continue to the 18th hour.

II. This paper describes the experiences of veterinary officers in controlling tuberculosis in cows supplying milk to Launceston, Tasmania. When the intradermal and subcutaneous tests were applied simultaneously, either or both temperature and dermal reactions were absent, or so modified that neither was satisfactory. Tuberculosis can be fairly easily controlled in a small area by the use of the subcutaneous test, but the intradermal test has advantages for a large-scale campaign.

In the discussion which followed the presentation of the two papers abstracted above, FETHERS pointed out that " no lesion " reactors are often due to the testing being done under difficult circumstances and to the subsequent *post-mortem* search for lesions not being sufficiently thorough. WOODWARD stated that, although the subcutaneous test had been replaced by the intradermal test in the U.S.A., this was not because the latter was thought to be more reliable. Post-injection temperature-taking should commence not later than the eighth hour, as reactions may be missed if the first temperature is taken at the tenth hour.—W. I. B. B.

FELDMAN, W. H., & FITCH, C. P. (1936). **Histologic Features of the Intradermic Reaction to Tuberculin in Cattle.**—*Arch. Path.* **22.** 495-509. 10 figs., 1 table. [10 refs.]

The cellular response which follows the subcaudal tuberculin test was studied in two groups of animals, *viz* (a) four experimental calves, two of which were infected with the bovine tubercle bacillus, one infected with an avian strain, and a fourth which served as a negative control ; and (b) 66 adult cattle subjected to ordinary routine tests. The skin reactions were excised under a local anaesthetic at the termination of the test.

Apart from differences in the relative amount of oedema in mild and severe reactions, the histological changes were very similar in all the positive animals. Microscopically, the characteristic feature was the appearance of large collections of histiocytes, although lymphocytes and giant cells of the Langhan's type were also noted in small numbers. In the experimental group, differences in the reactions to homologous and heterologous tuberculins are discussed.—R. E. GLOVER.

RATH, M. (1936). Przyczynki do dotychczasowych wiadomości o wśrodskórno-powiekowej metodzie malleinizacji. [**The Intradermo-Palpebral Mallein Test**].—*Przegl. wet.* **49.** 577-614. 4 tables, 1 chart. [Numerous refs.] [German summary].

R's experiments lead him to the conclusion that a second intradermo-palpebral injection of 0·2 c.c. of mallein, ten days after the first one, accentuates the

reaction. The first injection sensitizes the organism to the second. The author considers that old horses, pregnant mares and horses after hard work show atypical reaction to mallein injected intradermo-palpebrally, and that in such cases the conjunctival mallein test should be used.—A. Szwabowicz (Lwów).

I. Ravaglia, F. (1936). Un metodo rapido e pratico per mettere in evidenza l'infezione da Br. abortus nei bovini. [**Rapid Stained Antigen Slide Test for *Br.a.* Infection**].—*Nuova Vet.* **14.** 38-41. 2 figs., 1 table.

II. Lanfranchi, A., & Foresti, C. (1936). Del potere di esaltazione dei sieri normali sui sieri agglutinanti la Br. abortus bovis. [**Agglutination Titres in Bovine Contagious Abortion**].—*Ibid.* 275. [1 ref.]

I. R. discusses the rapid slide method for the diagnosis of brucella infection, the examination of the result being done under the microscope. Care must be taken to prevent coagulation. The results obtained by this method agreed closely with those obtained by the agglutination test.

II. The authors record that the addition of fresh normal human, equine, bovine or porcine serum to serum which agglutinates *Br.a.*, increases the agglutination titre of the latter serum by as much as six times. Indications were obtained that the same effect is produced when extracts of muscle or spleen are used instead of normal serum.—J. A. Nicholson.

Kritschewski, I. L., & Galanowa, N. W. (1936). Neue Wege zum Studium der Immunität und Allergie bei Infektionskrankheiten. VII. Uterusvaccination bei Brucellose. [**Immunity and Allergy in Infectious Disease. VII. Uterine Vaccination against Brucella Infection**].—*Arch. wiss. prakt. Tierheilk.* **70.** 302-312. 14 figs., 2 tables.

In continuation of previous work and following the methods described therein [*V. B.* **7.** 77.] K. and G. found that the uterine cells could not be immunized by a killed culture of *Br. abortus*, nor yet by a heterologous brucella strain such as an avirulent porcine strain. Immunity against virulent *Br. a.* could only be achieved by two doses of the same strain : it was very strong when once acquired. —J. E.

I. Moen, J. K., & Swift, H. F. (1936). **Tissue Culture Studies on Bacterial Hypersensitivity. I. Tuberculin Sensitive Tissues.**—*J. exp. Med.* **64.** 339-353. 8 figs. on 2 plates, 1 table, 3 charts. [6 refs.]

II. Moen, J. K. (1936). **Tissue Culture Studies on Bacterial Hypersensitivity. II. Reactions of Tissues from Guinea Pigs Infected with Group C Hemolytic Streptococci.**—*Ibid.* 355-368. 1 table, 4 charts. [11 refs.]

III. Freund, J., Laidlaw, Elizabeth H., & Mansfield, J. S. (1936). **Hypersensitiveness and Antibody Formation in Tuberculous Rabbits.**—*Ibid.* 573-582. 4 charts. [6 refs.]

I. Tuberculin, whether human or bovine, is markedly toxic to the cells when included in the medium used for tissue cultures of cells from tuberculous animals. No significant difference was found between the sensitivity of cells from animals infected with strains of low virulence and that of cells from creatures infected with virulent tubercle bacilli. *In vitro*, the sensitive state was found to persist through several transplantations involving many new generations of cells. The toxic effect was manifested by decreased activity, notably on the part of the macrophages and the fibroblasts. During the healing stage, or period of regression of the lesions, there was a return to normal growth energy, albeit a markedly sensitive state was still demonstrable by the addition of tuberculin.

II. Group C haemolytic streptococci, isolated from natural disease in g. pigs, provoked in these creatures a chronic low-grade type of disease characterized mainly by purulent lymphadenitis. A delayed inflammatory type of skin reaction to crude streptococcal extract was elicited as early as five days after infection, whereas neither precipitins nor increase in agglutinins was demonstrable until ten days later. *In vitro*, the streptococcal extract had a specific toxic effect upon cells from infected animals, which effect was manifested in cellular injury and inhibited cell growth and migration. No correlation was found either between cutaneous hypersensitivity and humoral antibody titre or between the degree of skin reactivity and the degree of sensitivity of splenic extract to bacterial extract *in vitro*.

III. In from two to six weeks after inoculation of bovine tubercle bacilli (intraven. or intratrach.) rabbits developed allergic skin sensitiveness to tuberculin. Thereafter the sensitivity rapidly increased, not without fluctuation in intensity, and was followed by a period of several weeks prior to death during which the animals failed to react to injection (intraderm.) of tuberculin.

Complement-fixing antibodies were demonstrable within two weeks after infection and continued to increase for a period of six to ten weeks. They were present in the serum in the later period of infection when cutaneous reaction to tuberculin was no longer detectable.—J. W. Emslie.

Šmanenkov, N. A., & Ivanov, N. F. (1935). Fiziko-chimičeskie svojstva precipitirujuśćich sibirejazvennich sivorotok. **[Physico-Chemical Characters of Anthrax Precipitin Serum]**.—*Bull. Moscow vet. Inst.* **1.** 49-58. 4 tables. [Numerous refs.] [German summary].

Š. and I. studied the following features of anthrax precipitin sera :– pH, electro-conductivity, viscosity and surface tension. They worked with sera of various degrees of activity, both fresh and a year old. All the sera were carbolized (0·5%). Specific electro-conductivity, pH, and viscosity tended to increase with the increased biological activity of the serum, and the proteins became more labile.

Sabin, A. B., & Olitsky, P. K. (1936). **Humoral Antibodies and Resistance of Vaccinated and Convalescent Monkeys to Poliomyelitis Virus.**—*J. exp. Med.* **64.** 739-748. 2 tables. [17 refs.]

A group of nine monkeys convalescent from poliomyelitis was retested by the intranasal route. Six resisted the test dose while three died after showing symptoms somewhat resembling poliomyelitis, although no virus was found in their central nervous systems.

In studying the immunity of convalescent and vaccinated monkeys, it was noted that, contrary to the findings of Jungeblut [(1931). *J. exp. Med.* **53.** 159.] no antibodies were found in the preparalytic stage ; in fact, they were not detected before two to three months after the onset of paralysis. Convalescent monkeys were sometimes resistant to infection at a time when their sera were negative ; on the other hand, antiviral bodies were readily detected in the serum of vaccinated animals which proved fully susceptible to the nasal instillation of the virus.
—R. E. Glover.

I. Goret, P., Vuillaume, P., & Lelandais, E. (1936). Préparation d'un sérum homologue spécifique contre la maladie de Carré. **[Preparation of a Specific Homologous Serum against Canine Distemper]**.—*C. R. Soc. Biol. Paris.* **122.** 1283-1286. [5 refs.]

II. GORET, P., BARDACH, N., & LELANDAIS, E. (1936). Sur le titrage sérum contre la maladie de Carré par la méthode de déviation du complément. **[Titration of Antiserum against Canine Distemper]**.—*Bull. Acad. vét. Fr.* **9.** 315-320. 3 tables. [4 refs.]

I. The authors prepared an antiserum against the canine distemper virus by immunizing dogs with ferret spleen suspensions (1 : 10 in normal saline). The dogs received three doses of 10 c.c. each at intervals of a few days and were bled on the seventh day after the last inoculation. The serum was tested for potency on ferrets, and 1 c.c. was capable of saving them from the effect of one to ten thousand M.L.D. of virus.

II. The authors give the results of c.f. tests of samples of antiserum, using as antigen a brain suspension of infected ferrets. Serum was found to react also with non-infected ferret brain and with the spleen of infected and non-infected ferrets. An unsuccessful attempt was made to remove the non-specific antibodies by placing the antiserum in contact with normal brain antigen for a period before mixing it with the infected ferret brain antigen.—J. E.

MURAO, K., & MORIMOTO, T. (1936). Ueber das Elektro-Antivirus. **[Electro-Antivirus]**.—*Zlb. Bakt. I. (Orig.).* **137.** 210-213. 4 tables.

Broth cultures of *Staphylococcus aureus* were subjected to the action of a 100 V. electric current for from five to ten minutes. The culture was then filtered through a bacterial filter and the cell-free filtrate was reinoculated with staphylococci. After about four repetitions of this procedure, staphylococci could no longer grow in the filtrate, which was named electro-antivirus. When this material was inoculated into mice or rabbits it inhibited (often completely) the development of artificial *S. aureus* infection.—E. J. PULLINGER.

CELAREK, J., & FEJGIN, B. (1936). Sur le rapport entre la staphylotoxine et les toxines des anaérobies de la gangrène gazeuse. **[Relationship between Toxins of Staphylococci and Those of the Gas Gangrene Group]**.—*C. R. Soc. Biol. Paris.* **122.** 133-136. [4 refs.]

Rabbits were immunized with anatoxins prepared from *Clostridium welchii*, *Cl. oedematiens*, *Cl. histolyticum* and *Vibrion septique*. The sera were tested *in vitro* for the inhibition of the haemolytic activity of a staphylococcus toxin and *in vivo* for neutralizing powers. There were indications of a marked affinity between staphylococcus and *Cl. histolyticum* toxins, while some slight relationship existed between the former and the toxins of *Cl. welchii* and *V. septique*.—R. E. GLOVER.

I. LLOYD, B. J. (1936). La vaccination contre la peste bubonique. **[Vaccination against Bubonic Plague]**.—*Bull. Off. int. Hyg. publ.* **28.** 1073-1077. [6 refs.]

II. GIRARD, G., & ROBIC, J. (1936). La vaccination de l'homme contre la peste au moyen de bacilles vivants (virus vaccine E.V.). Son application à Madagascar. **[Vaccination against Human Plague with Live Vaccine in Madagascar]**.—*Ibid.* 1078-1087. [2 refs.]

III. OTTEN, L. (1936). **Immunisation against Plague with Live Vaccine.**—*Indian J. med. Res.* **24.** 73-101. 10 tables, 1 graph. [Numerous refs.]

IV. ANON. (1936). **Plague Vaccines and Serum.**—*Lancet.* **231.** 440-441. [4 refs.]

V. KOLAYLI, C., MAVRIDIS, N., & ARAYCI, E. (1936). Quelques observations sur les animaux destinés à la preparation du sérum contre les septicémies hémorragiques, comme le barbone et le choléra des poules. **[Immunization**

of Animals for Production of Pasteurella Antisera].—*Rev. gén. Méd. vét.* **45.** 331-333.

The non-veterinary abstracts of this group are included as of interest in relation to the general question of immunization against pasteurella.

I. A brief review of large scale immunization against plague in South America and California. L. points out the lack of reliable statistics concerning the efficacy of such vaccines and considers that in the control of human plague, anti-rat and hygienic measures are as important as vaccination.

II. G. and R. describe a live vaccine. It is made from a strain which has been grown on gelatin at 16-20°C. since 1926 and, by 1931, had become avirulent for laboratory animals except in large doses. This live vaccine is said to have been much superior to dead vaccines hitherto used. It gave good results in large-scale vaccination of persons in affected areas.

III. O. has also found that dead vaccines are useless, and has devised a live vaccine from an avirulent strain of *Past. pestis*. The use of this vaccine on a large scale, with adequate controls, has reduced mortality from plague in the Dutch East Indies to one tenth of the former incidence. O. has succeeded in isolating from several virulent strains, avirulent variants, unaltered in colonial appearance and in antigenic structure, and thinks that similar strains in other infections should be used for the manufacture of vaccines. He finds that there are at least two immunizing antigens in his vaccine strain of *Past. pestis*. He does not consider that the superiority of live vaccine is due to multiplication in the body, but rather to the fact that the antigens have not been altered by heat or chemicals.

IV. A review of the recent work of Girard and Robic in Madagascar, Otten in Java, Kurauchi and Homma in Manchuria and of Sokhey and Maurice in India. It mentions that Kurauchi and Homma have studied a specific immunizing fraction (S.I.F.) of *Past. pestis* which, when combined with metallic salts, is an effective antigen and does not produce secondary reactions. Sokhey and Maurice have made some observations on a new and improved method of making antipestis serum from horses. The use of this serum has given very promising results in a limited number of cases of plague.

V. Asses which had been used for the production of anti-pasteurella serum were rested for two months. When reinoculated at the end of this time with large doses of live pasteurella culture, they developed signs resembling those of tetanus, and died after four days. On *post-mortem* examination, the lungs were found engorged with blood and pasteurella organisms were isolated. The authors conclude that immunity against pasteurella is only temporary. [The authors were working with the organisms of buffalo haemorrhagic septicaemia and of fowl cholera].—C. McG.

DISEASES, GENERAL.

Arey, L. B. (1936). **Wound Healing.**—*Physiol. Rev.* **16.** 327-406. [Num. refs.]

This article does not lend itself to abstraction. It is a very comprehensive review of the available information concerning the healing of wounds presented under the following main headings :– conditions influencing wound healing, events of wound healing, mensuration, physico-chemical relations, factors influencing healing and the nature of the formative stimulus. Its usefulness can be recommended alike in regard to the information given and to the exhaustive list of references appended.—J. W. Emslie.

FROEBEL, O. (1933). Ueber den Einfluss der Infektion auf die Gewebsatmung. **[Influence of Infection on Tissue Respiration]**.—*Inaug. Diss., Zürich.* pp. 47. 20 figs., 18 tables. [Numerous refs.]

Using Warburg's manometric method for the determination of tissue oxidations, F. studied the changes produced in g. pig tissue after the animals had been inoculated with various aerobic and anaerobic pathogenic organisms. It was found that liver and kidney oxidations were increased, the highest values being obtained in liver tissue taken shortly before death. No relationship, however, could be found between clinical symptoms, body temperature and tissue respiration.

In vitro experiments showed that infection of bacterial filtrates also increased tissue respiration, as did the use of sterile broth. It is concluded that the effect is secondary, and is probably due to the presence of foreign protein.—J. A. N.

ZAVRNIK, F. I. (1934). Kako je zdravlje naše narodne stoke zaštićeno. **[Animal Husbandry and Livestock Diseases in Yugoslavia]**.—*Jugoslov. vet. Glasn.* **14**. 273-292. Numerous tables, 1 map. [4 refs.]

Z. compares veterinary and livestock health conditions in Yugoslavia and Germany. In Yugoslavia there is a great shortage of veterinary surgeons – 742 in 1934 : twice as many are needed if the animal industry is to be properly served. In the northern and western regions the situation is much better than in the south and east. In the most advanced " banovina " [counties] the number of veterinarians in Yugoslavia, in comparison with the number of animals, is about half that in Germany. The comparatively high percentage (54) of veterinarians in government service is striking. Most of the remainder are municipal veterinarians, army veterinarians, etc. Only a few are in private practice.

As there are many students both at the Veterinary College at Zagreb, and at the recently opened one at Belgrade and there are many students abroad, quick improvement may be hoped for.—B. OSWALD (SKOPLJE).

GRIGNANI, A. (1936). La patologia veterinaria nell' A.O.I. **[Veterinary Medicine in Italian East Africa]**.—*Azione vet.* **5.** 469-476.

The most prevalent diseases in Italian East Africa are rinderpest, horse-sickness, anthrax, rabies, piroplasmosis and trypanosomiasis. Of these, rinderpest causes the greatest loss. It attacks humpless cattle, zebu cattle and buffaloes and is always acute, the mortality rate being 90 % or over. To be of any value, vaccination must be carried out at yearly intervals.

Horse-sickness is also wide-spread and occurs at heights above 2,000 metres. Donkeys appear to be fairly resistant to the disease.

A description of the symptoms and *post-mortem* findings of some of these diseases is given.—J. A. NICHOLSON.

PFANDLER, L. (1936). Untersuchungen mit der Sublimat-Serumprobe. **[Sublimate Tests in Blood Diseases]**.—*Wien. tierärztl. Mschr.* **23.** 715-716.

Sublimate tests were carried out according to Oppermann's method on healthy and diseased horses, cattle, pigs, goats and rabbits. Of 145 horses tested (not affected with equine infectious anaemia), 84·1 % gave positive reactions. Clinically healthy and diseased animals frequently gave positive reactions. Two cases of equine infectious anaemia gave positive results. P. maintains that numerous different physiological and pathological factors which increase protein bodies in the blood are precipitated by the sublimate.

The reactions of all the animals tested were in agreement with the albumin composition of the blood. In the case of horses and cattle with an almost similar

albumin-globulin quotient, results were approximately equal. In the case of dogs, pigs, rabbits and goats with a high albumin-globulin quotient, reactions were weak (10,000 to 20,000), and in the case of a hen in which the albumin-globulin quotient is relatively the smallest, the reaction was strongest (70,000). P. does not believe in the efficacy of the sublimate test as a diagnostic measure for infectious anaemia.
—M. Burke.

Rubarth, S. (1936). **On Some Congenital Lung Anomalies in Animals.**—*Skand. VetTidskr.* **26.** 581-606. 8 figs. [Numerous refs.] [In English: German and Swedish summaries].

There were only 11 recorded cases of congenital anatomical lung defects in animals among the 8,500 autopsies carried out during the past 20 years at the Stockholm Veterinary College. Descriptions of these conditions are very rare in literature but the following abnormalities are described in detail :–

(1). Lung hypoplasia – four cases in new-born calves.

(2). Congenital hyperplasia – one case in a foal, believed to be the first case recorded in veterinary literature.

(3). Congenital cystic anomalies – two cases in which there was cystic metamorphosis of one lobe (bitch and horse).

(4). Abnormalities of lobe distribution – one horse and two dogs.

(5). Ectopia pulmonum – one case in an almost full-term bovine foetus which also showed a variety of other congenital abnormalities.

In general, lung anomalies appear to occur most commonly in calves, there now being records of 20 cases, including the five cases described here.—E. G. W.

Iriminoiu, I. (1936). Focare spontane de coriza cangrenoasă in Transilvania. [**Malignant Bovine Catarrh in Rumania**].—*Rev. Med. vet., Bucaresti.* **48.** 290-293.

The author describes the first appearance in Rumania (1927) of malignant bovine catarrh. The disease appeared in either a very acute form, or an atypical form with ophthalmic, pulmonary and intestinal symptoms.—J. E.

Urbain, G. (1936). Essais sur la pathogénie et le traitement de la paraplégie hémoglobinurique du cheval. [**Pathogenesis and Treatment of Myohaemoglobinuria of the Horse**].—*Ann. Méd. vét.* **81.** 355-366. 1 fig. [1 ref.]

Recent researches into the chemical physiology of muscle permit new conceptions of the pathogenesis of myohaemoglobinuria. The work of Viale and others and the role played by the various substances taking part in muscular contraction are discussed, and U. finally advances the opinion that the trouble is due to a breakdown of the intramuscular oxidization of lactic acid. This is not due to a lack of oxygen – venous blood drawn from an affected animal is abnormally oxygenated – and the administration of oxidizing agents has proved valueless. It seems more a failure of the catalysts which bring about the oxidization, and which arise in the cortex of the adrenals.

U., therefore, considers the disease as primarily a temporary failure of the adrenal secretion, and has investigated his theory from the therapeutic aspect by injecting adrenaline (as ephedraline) in a number of cases of myohaemoglobinuria of varying severity. Only one failure is recorded, and in this case death was considered to be due to infection of decubitus sores. The remaining cases made rapid and complete recoveries [see also *V. B.* **1.** 234].—Norman Hole.

OPPERMANN, T. (1936). Ueber das Eczema seborrhoicum siccum beim Pferde. [**Dry Seborrhoeic Eczema in the Horse**].—*Dtsch. tierärztl. Wschr.* **44.** 436-440. 8 figs. [Numerous refs.]

After giving a brief review of seborrhoeic eczema in man and the domestic animals, O. describes nine cases in horses admitted to the Hanover clinic during the period 1927-1936.

It was found that age, sex, breed and colour of the hair had nothing to do with susceptibility to the disease. No vegetable or animal parasites were found in any of the affected animals.

A variety of therapeutic agents was tried, but the results were not beneficial, except in the case of thyroxin. Three out of seven animals, treated at intervals of three to four days with intravenous injections of this hormone were completely cured.

The skin lesions are well illustrated by photographs.—E. G. WHITE.

LÁSZLÓ, F. (1936). Endometriose und verwandte Veränderungen. [**Endometriosis**].—*Dtsch. tierärztl. Wschr.* **44.** 706-708. 1 fig. [1 ref.]

This is believed to be the first description in veterinary pathology of external endometriosis. Small, dense tumour-like masses of endometrial tissue were found in the serosa of the vagina and uterus of a cow. The endometrium and myometrium were macroscopically normal, but on histological examination the outer muscular coat showed collections of ducts which were often branched and were lined by a single layer of epithelium. The tubules were embedded in a cellular connective tissue-stroma. The tumours were similar in structure except that in some of the pedunculated masses, haemorrhage, necrosis and even calcification were present.

In man, the condition is usually regarded as being due to the displacement of islets of epithelium into the muscular or serous layers and is usually accompanied by a diffuse glandular hyperplasia of the mucosa. The latter condition is common in carnivora and often results in pyometra. Involvement of the serosa (endometriosis externa) appears not to have been recorded in animals. Hyperplasia of the fibrous tissue or muscle as well as of the glands (adenofibrosis and adenomyosis respectively) has been recorded in the dog. Heterotopia of the oviduct epithelium is not uncommon in the pig and is considered by L. to be possibly related to endometriosis.

The possible aetiology of the condition is discussed – developmental abnormalities of the uterine epithelium, migration of epithelial cells up the oviduct in obstructed menstruation, inflammation, and finally, true neoplasm (endometrioma); only the first and last are considered to be possible explanations in the case recorded.
—E. G. WHITE.

WEYEL, W. (1936). Ueber Granulosazelltumoren bei Tieren und ihr hormonales Verhalten. [**Granulosa Cell Tumours in Animals and Their Hormonal Relationship**].—*Dtsch. tierärztl. Wschr.* **44.** 550-553. [Numerous refs.]

W. considers that these tumours are more common than is indicated by reports in literature since, owing to the variety of their structure, they have often been included in descriptions of other classes of neoplasms. They are commonest in cattle and three cases are described. The material was obtained from the abattoir and no clinical history was available.

In two animals the tumour involved the right ovary, in the third animal the left ovary, the weights being 9,500, 7,500 and 1,150 g. They were benign, lobulated tumours composed of spheroidal or spindle-shaped cells with indistinct cell boundaries.

The oestrone content was in all three tumours considerably higher than that in the normal ovary of the cow namely 10,000, 10,000 and 20,000 mouse units per kg. as compared with 200 m.u. per kg. for ovarian tissue. In one animal a normal four months' foetus was present ; in the other two cases there was evidence of hormone activity in the form of widening of the uterine cavity, hyperaemia, and hypertrophy of the uterine glands.—E. G. WHITE.

BALOG, P. (1936). Histologische und experimentelle Untersuchungen über das infektiöse Vulvapapillom der Kuh. [**Infectious Papilloma of the Vulva of the Cow**].—*Arch. Derm., Berl.* **173.** 518-530. 5 figs.

Papillomata are not uncommon near the vulva of cows in Egypt. Young animals are the most frequently affected and the tumours may be single or multiple. They vary from the size of a pea to that of a hazel nut, and are always covered with a thin hairless epidermis, which remains intact.

Two affected animals were studied and three tumours were used for the experiments, one half of each being used for histological examination and the other half for transmission experiments.

Histologically, the growths were covered by a non-pigmented epidermis, which possessed neither glands nor hair follicles. The neoplasm itself consisted of fibroblasts of varying size and shape, some being extremely large.

Filtrates of the tumour tissue were injected intravenously and intraperitoneally into rabbits and g. pigs, but the results were in all cases negative. In four rabbits, a compress of the filtrate was applied to a cut in the ear for 15 minutes. The wound healed well, but two months later pinhead-sized nodules were seen in the scar in three rabbits. When these had grown to the size of a pea they were examined histologically and were found to be identical in structure with the tumour of the vulva. No attempts at further transmission were made owing to lack of material. —E. G. WHITE.

GLASER, R. (1935). Die pathologische Anatomie und Histologie der Geflügellähme. [**Pathology of Fowl Paralysis**].—*Inaug. Diss., Munich.* pp. 59. 2 figs. on 1 plate. [Numerous refs.]

This thesis consists almost entirely of a comprehensive review of the literature on the pathological anatomy of fowl paralysis. The lesions are classified histologically as a productive inflammation, in contradistinction to certain nervous derangements of fowls which are characterized by primary degenerative changes, *e.g.* those due to deficiency of vitamin B complex, of vitamin A, or vitamin E, or to excessive protein in the diet.

Finally, G. records the occurrence of nutritional paralysis similar to that recorded in the U.S.A. but not previously recognized in Germany. The main symptom was marked inward curvature of the toes. Administration of milk products or yeast had a beneficial effect. Macroscopic examination of the nerves, joints and tendons failed to reveal any pathological changes. The condition was met during experiments on vitamin A deficiency, and in the form of spontaneous outbreaks on two poultry farms.—E. G. WHITE.

ANON. (1936). **Etiology of Endemic Goitre.**—*Occ. Commun. Imp. Bur. anim. Nutr., Aberd.* No. 2. pp. 6. 1 appendix. [fcp] [Mimeographed].

It seems unlikely that additional new information will be forthcoming from further surveys of the iodine content of soil, food or water in areas of low and high goitre incidence. An approach to the metabolic side of the problem is indicated by recent investigations into urinary iodine excretion, but such information is of

doubtful value in the absence of exact experiments on iodine metabolism balance. There is a steadily increasing body of opinion that, although the level of iodine intake remains an important factor, iodine deficiency alone fails to explain either the nature or the distribution of endemic goitre. An important recent suggestion is that the condition is associated with the high radio-activity of soils and waters, a view which receives support from surveys of the radio-activity of certain areas and from experiments on small animals. Appended are details of preliminary experiments that have been begun at the Rowett Institute regarding iodine metabolism and the relation of radio-activity to goitre.—J. W. Emslie.

Stewart, W. L., & Ponsford, A. P. (1936). **Border Pining in Sheep – II.**—*J. comp. Path.* **49.** 49-62. 2 figs., 6 tables. [Numerous refs.] [See also *V. B.* **6.** 451].

In the previous article it was suggested that, in Northumbrian or Border " pining ", the main clinical or biochemical findings were due to parasitic gastro-enteritis. This, however, does not explain fully many of the peculiar findings in the condition. In the present paper data for pasture, blood and bone analyses would indicate that there might be a tendency towards a deficiency of Ca, P and iron. In some cases the authors contend that the deficiency is of such a nature as to induce specific malnutrition. Since it is also shown that the main symptoms of the disease are due to nematodes (Trichostrongylineae) the authors suggest that it is due to a combination or interaction of malnutrition and gastro-intestinal parasitic infestation.

Border " pining " will require further investigation before the above hypothesis can be adopted as the correct explanation of the various anomalies found in connexion with this disease.—James Stewart.

Fooy, J. P. (1936). Over de albumine-globulineverhoudingen in het bloedserum van gezonde en zieke dieren. [**Albumin-Globulin Ratio in the Blood Serum of Healthy and Sick Animals**].—*Tijdschr. Diergeneesk.* **63.** 433-443 and 499-510. 1 table. [15 refs.] [English, French and German summaries].

F. found a considerable variation in the albumin-globulin ratio in sera of healthy horses and cattle and that it was unaffected by growth, lactation and gestation. Diseases associated with expensive tissue destruction caused a non-specific increase in globulin and a decrease in albumin.—M. J. J. Houthuis (Rotterdam).

I. Cunningham, I. J. (1936). **The Distribution of Magnesium in the Animal Organism and the Effect of Dietary Magnesium.**—*N. Z. J. Sci. Tech.* **18.** 419-423. 5 tables. [4 refs.]

II. Cunningham, I. J. (1936). **Grass Staggers and Magnesium Metabolism.**—*Ibid.* 424-428. 2 tables. [13 refs.]

I. Analyses show Mg to be distributed evenly throughout the ash of the limb bones of sheep. The content in various organs of cattle, sheep, and rats is given, Mg being similar in quantity in the same organs of each species. In rats severe restriction of Mg causes a reduction in the Mg content of bones and blood serum only. Increased Mg intake results in a marked increase in the bones and blood serum and not in other organs.

II. Analyses of pasture throughout the year and of animal tissues show that there is not a definite deficiency of Mg to account for the hypo-magnesaemia displayed in grass staggers. Considerable hope is entertained that dolomite, magnesium sulphate or molasses given in ensilage will prove effective in controlling the disease.—C. S. M. Hopkirk.

GOETTSCH, Marianne, PAPPENHEIMER, A. M., & HART, Anna. (1936). **The Prevention of Nutritional Encephalomalacia in Chicks by Vegetable Oils and their Fractions.**—*J. biol. Chem.* **114.** 673-687. 6 tables. [12 refs.]

A protective factor against nutritional encephalomalacia of chicks is present in corn oil, cottonseed oil, hydrogenated cottonseed oil, peanut oil and soya bean oil. It can be partially extracted by 95% ethyl alcohol, and this extract is stable. The factor is thermostable and resistant to aeration and to ultra-violet irradiation. It is present in the non-saponifiable fraction, if due precaution is taken against oxidation during saponification.—J. M. ROBSON.

POISONS AND POISONING.

GRIMMETT, R. E. R., MCINTOSH, I. G., WALL, Eunice M., & HOPKIRK, C. S. M. (1937). **Chronic Zinc Poisoning of Pigs.**—*N. Z. J. agric.* **54.** 216-223. 3 figs., 1 table. [5 refs.]

Zinc lactate was fed to three young "weaners" in milk at the rate of 0·1 per cent. of the food. Before being killed the pigs ate from 800 to 1,000 g. of zinc lactate. Two months after the feeding commenced, stiffness was much in evidence and the pigs were showing unthriftiness. Blood analysis showed normal Ca and P_2O_5.

Post-mortem examination disclosed a porous condition of the ends of the long bones, particularly of the humerus, and a very slightly brittle condition of the ribs. Some arthritis was present in several of the joints. Considerable quantities of zinc were found in the kidneys, liver and bones of the fed pigs. The changes were due to a disturbance of mineral metabolism.

Further experiments in pig feeding are being carried out.—C. S. M. HOPKIRK.

SCHWIEGER, H. (1936). Ueber die Bewertung der klinischen Dopingerscheinungen an Rennpferden. [**Detection of Doping in Race Horses**].—*Inaug. Diss., Berlin.* pp. 42. [8 refs.]

From observations of 1,212 horses under racing conditions, S. found that 420 displayed abnormality – excitement, sweating, lack of control, etc. It being apparently established that none of the horses was under the influence of a drug, S. concludes that clinical observations alone cannot afford more than a suspicion of possible drugging.—G. D. LANDER.

ALBERT, A. (1935). *Myoporum deserti.* **A Preliminary Investigation.**—*J. roy. Soc. N.S.W.* **68.** 144-148. 1 table.

A report on a chemical investigation of the shrub, *M. deserti*, which has been shown by feeding tests to be toxic for sheep and a calf. Acetone extract of leaves was non-toxic, the extracted leaves remaining toxic. Alcoholic extraction rendered both the extract and the residual material non-toxic. From the alcoholic extract was isolated a volatile oil containing a large percentage of an unidentified ketone. No substance to which the plant's poisonous nature could be attributed was isolated, but there is some evidence of the presence of a glucoside.—W. I. B. B.

PHYSIOLOGY.

SELYE, H. (1936). **Thymus and Adrenals in the Response of the Organism to Injuries and Intoxications.**—*Brit. J. exp. Path.* **17.** 234-248. 1 text fig., 2 figs. on 1 plate, 8 tables. [10 refs.]

Experiments are described which show that a syndrome consisting of rapid involution of the thymus, formation of a pleural transudate, and adrenal enlargement with loss of cortical lipoids, is produced in the rat by certain operative injuries, drugs, exposure to low temperature, and stimuli merely causing nervous excitement. The involution produced thus is more pronounced than that which follows fasting and is, therefore, not due to failure of the animal to eat.

All the injuries and drugs which normally cause thymus involution are without effect on the size of the thymus of adrenalectomized animals nor is the ability to undergo involution restored by administration of NaCl, cortin in large doses, or adrenaline treatment. In hypophysectomized animals the effect is much less than in normal animals.

A method for the isolated removal of the adrenal medulla with a suction pump is described. The thymus of rats thus deprived of medullary tissue but still in possession of active cortical tissue shows little if any ability to involute. From these observations it seems that both the cortex and the medulla have to be active to allow of thymus involution.—R. ALLCROFT.

MOBERG, E. (1936). Ueber die sog. kompensatorische Nierenhypertrophie nebst Studien zur Bestimmung der Leistungfähigkeit der Niere. Experimentelle Untersuchungen an der Ratte. [**Compensatory Renal Hypertrophy (Rat Experiments)**].—*Acta path. microbiol. scand.* Suppl. 31. pp. 161. 5 figs. on 1 plate, 36 tables. [Numerous refs.] [In German : English summary].

Using a large number of white rats, M. removed varying amounts of renal tissue and studied the behaviour of the surviving kidney with reference to the excretion of water, urea and chlorides. To this end he devised ingenious tolerance tests, and also examined the kidneys histologically at the end of the experiments.

It was found that animals with only one-ninth to one-tenth of the normal renal tissue could remain healthy for as long as two months. It was found also that there existed no direct relation between anatomical hypertrophy of the surviving renal tissue and functional improvement. The important factor is not the presence of enough renal tissue for survival but how long this tissue can successfully carry out excretion : animals might remain healthy for several months and then suddenly die of renal insufficiency.—E. G. WHITE.

PŘIBYL, E. (1935). Diagnosa březosti u domácích zvířat průkazem pohlavních hormonů. [**Hormonal Diagnosis of Pregnancy in Domestic Animals**].—*Klin. spisy Šk. zvěrolék., Brno.* **12.** 173-212. 4 text figs., 1 fig. on 1 plate, 5 tables. [Numerous refs.] [German summary].

Immature female g. pigs can be used for testing follicular hormone in the urine of pregnant mares. The urine, fresh or preserved, is injected (subcut.) in a dose of 1 c.c. per 20 g. body weight (total 5 doses in 3 days). Two to three days later, vaginal smears are prepared and examined microscopically. The picture shows the different stages of the sexual cycle, as in mice.

The test for gonadotropic hormone in the blood serum of mares is made on female rabbits, weighing at least 2,200 g. The blood serum (12 c.c.) is injected into the ear vein. The ovaries are examined after laparotomy immediately before the injection and 48 hours later.

The follicular hormone occurs in the urine of mares by the fourth month after the conception, and the gonadotropic hormone in the blood in the fifth month. Both tests are reliable for the diagnosis of pregnancy in mares in almost 96 % of cases.

STANKIEWICZ, W. (1936). Chemiczna analiza kału konskiego. [**Chemical Analysis of Horse Faeces**].—*Wiad. weteryn.* **15.** 243-255. [6 refs.] [German summary].

S. examined horse faeces in respect of pH, water content, ash, crude protein, true protein, crude fibre, cellulose, pentosans and fat.—A. SZWABOWICZ (Lwów).

TECHNIQUE.

POOMAN, A. (1936). Weitere Erfahrungen bei der Färbung von Lepra- und Tuberkelbakterien. [**Staining of Leprosy and Tubercle Bacilli**].—*Arch. Schiffs- u. Tropenhyg.* **40.** 533-538.

Modified technical procedures for staining smears and sections for mycobacteria are outlined. Smears may be decolorized and counterstained in a single process by the use of an alcoholic solution of methylene blue. For sections, decolorization by alcohol for one minute followed by 25% nitric acid for 15 seconds is advocated. It is emphasized that members of the genus *Mycobacterium* are only relatively alcohol-fast and acid-fast and that decolorization must, therefore, be carried out very carefully.—E. J. PULLINGER.

KNÖLL, H. (1936). Manometrische Messungen an Einzelplatten zur Anaerobenzüchtung. [**Manometric Measurements of Anaerobic Cultures**].—*Zlb. Bakt. I. (Orig.).* **137.** 230-240. 3 figs., 1 table. [4 refs.]

An experimental method is described which permits the continuous registration of manometric measurements when using closed petri dishes. It is useful in connexion with the preparation of anaerobic cultures, to test the air-tightness of the plugs. The plugs used were not air-tight, but capillary experiments showed that, within certain limits, this did not essentially affect the cultural results. —M. BURKE.

SANDOMIRSKIJ, J., & ČERNOMORDIK, A. B. (1936). O novom metode E. V. Koslovskogo differencialnoj okraski brucell. [**Kozlovskij's Method of Staining** *Brucella abortus*].—*Uchen. Zap. Vitebsk vet. zoo. Inst.* **4.** 231-236. 1 table. [2 refs.] [German summary].

KOZLOVSKIJ used a 2% watery solution of safranin and a 1% solution of malachite green for staining smears. *Br.a.* appeared bright red on a green background. S. and C. found that the method was of some value, but that, in the case of old cultures, organisms other than *Br.a.* sometimes took the same colour, thus creating confusion. They consider that the method should be further worked out

OFFICIAL AND OTHER REPORTS.

ITALY. (1936). Istituto Zooprofilattico sperimentale delle Venezie. R. Università di Padova. Relazione sull'attivita svolta dall'Istituto durante l'anno 1935. [**Report of the Veterinary Research Institute, Padua, for 1935**]. [BARDELLI, P.] pp. 26. 6 tables. Padua: Luigi Scudier.

The most prevalent infectious diseases met with in Venetia during 1935 were swine fever, bovine contagious abortion and fowl cholera. During the latter part of the year there was a serious outbreak of foot and mouth disease. Abortion in cattle due to trichomonas infection appears to be increasing but tends to be limited to definite districts. Bulls probably play a large part in spreading the infection to healthy cows.

Numerous specimens were submitted for examination and the production of sera and vaccines formed a major part of the Institute's work. The members of the staff were also much occupied in the control of bovine sterility. The most common lesion in cows which remained permanently sterile was cervicitis, next in importance being affections of the uterus, vagina and ovaries. Malformations only accounted for a very small number of animals which remained sterile.
—J. A. NICHOLSON.

ERITREA. (1936). Istituto Siero Vaccinogeno Eritrea. Relazione sull'attivita' svolta dall'istituto durante l'anno 1934-35. [**Report of the Serum and Vaccine Institute of Eritrea, 1934-1935**]. [CILLI, V.]—*Nuova Vet.* **14.** 85-120. 20 figs., 6 tables.

The institute is chiefly engaged in the preparation of sera and vaccines for human and veterinary use, but also undertakes the examination of samples of milk and butter, and of specimens, of both human and animal origin, submitted for diagnosis.

The production of rinderpest serum and vaccine forms the largest part of the institute's work. Every step is taken to ensure that the animals used for this purpose are free from disease, but in this connexion fascioliasis is a frequent source of trouble. The simultaneous injection of serum and virus is the method of immunization adopted and it is claimed that very satisfactory results have been obtained by the use of 0·5 c.c. of infected blood and 50 c.c. of serum. A vaccine prepared from emulsions of spleen has also given very satisfactory results.

It has been observed that horse-sickness is more prevalent in the low-lying parts of the territory and usually reaches its maximum intensity during or immediately after the rainy season. Various vaccines have been tried and the method now adopted is to prepare a formolized emulsion of spleen, liver and lymph nodes taken from animals suffering from an acute attack of the disease. After incubation for 48 hours at 37°C. the vaccine is ready for use. It appears to produce a fairly solid immunity when given in doses of from 40 to 50 c.c.

The value of " gonacrine " for the treatment of piroplasmosis and trypanosomiasis has been tested. In one case, following the injection (intraven.) of 100 c.c. of a 1% solution, the piroplasm disappeared from the blood stream in 24 hours. It has little effect on *Tryp. vivax* but the drug affects the vitality of rinderpest virus leading to attenuation and, eventually, to destruction; it is consequently useless for the destruction of protozoa in virulent blood.

The report concludes with abstracts of papers which have been published during the year.—J. A. NICHOLSON.

BOOK REVIEWS.

PANISSET, L. [Professeur à l'Ecole vétérinaire d'Alfort]. (1936). La lutte contre la tuberculose bovine en France. Les bases actuelles de la réglementation. Tuberculine et tuberculination. Législation. [**The Control of Bovine Tuberculosis in France**]. pp. 127. 1 appendix. Paris: Vigot Frères. [8vo] [Fr. 15].

This can be described as a Handbook of Acts and Orders dealing with the control of bovine tuberculosis in France. The former legislation which had been in force for over 30 years having proved ineffective, new laws were passed in 1933. The general principle is that of voluntary entry on the part of stock-owners into a scheme including tuberculin testing of cattle, elimination of reactors, disinfection

of stables, and the registration of all free herds after 2 consecutive tests at intervals of 6 months with no reactors. The state encourages farmers to adopt the scheme by the offer of grants subject to control of the measures to be taken.

The procedure is described in Chapter I. When an application to enter the scheme is received it is examined by the local Prefect, who passes it on to the Chief Veterinary Officer of the district, who returns it with his comments. The applications are considered by a Committee consisting of the Prefect, as chairman, the Chief Veterinary Officer who is the Secretary, and a member appointed by the County Chamber of Agriculture. The Committee draws up a list of the farms and decides the order in which they are to be dealt with. The Prefect then notifies the applicants and informs them of the conditions to be fulfilled and what subsidy will be granted.

The Chief Veterinary Officer of the district supervises the local veterinary officer in his duty of testing. His fee is settled by a decree of the Ministry of Agriculture and Finance. The veterinary officer visits the farm, isolates the animals found on clinical examination to be infected and puts an embargo on the movement of these animals except to an abattoir. When all such infected animals have been slaughtered, the tuberculin test is applied to the remainder. No special form of the test is laid down, it being left to the choice of the veterinary officer. There is one exception: if it is required to establish the fact that an animal is tuberculous, for the purpose of returning it as unsound after purchase, the subcutaneous test, giving either a single or a double dose, is prescribed.

The rules for dealing with the meat and milk from tuberculous animals are as follows :–

Meat.—The flesh of cattle, horses and pigs which have been slaughtered and found tuberculous is seized and its sale for consumption prohibited in the following cases :– (a) acute miliary tuberculosis with numerous foci; (b) caseous tuberculosis with voluminous soft foci or extending to several organs, and (c) extensive caseous tuberculosis accompanied by glandular lesions with caseous " streaks ". In all other cases the prohibition is partial; every organ or part containing tuberculous lesions must be denatured or destroyed. Provision is also made for the sterilization of certain parts under steam pressure and for the utilization of the product as " sterilized flesh ".

Milk.—All milk from animals suffering from advanced tuberculosis of the lung, or tuberculosis of the intestine, udder or uterus, must be destroyed. Milk from tuberculous animals and milk containing tubercle bacilli must not be used for human consumption except after the application of sufficient heat to destroy the bacilli.

Chapter II is a complete guide to the nature of tuberculin, its production, its physiological properties, the nature of its reaction, the methods of use, the technique of the various tests – subcutaneous, intradermal, double intradermal, conjunctival – the method of reading the reactions, the defects of the tests and how to minimize them. P. declares that, in spite of its real defects (which are much less serious than has been made out) tuberculin is a delicate and certain diagnostic agent, and that in the ordinary conditions of practice its indications can be accepted as authoritative, at least as regards positive reactions.

In Chapter III all the relative Acts and Orders are set out in full and in an appendix the copies of all official circulars relating to the application of the measures in force are reprinted.—F. Bullock.

Schmaltz, R. [Prof. der Tierärztlichen Hochschule zu Berlin. Dr. med. vet., Geh. Regierungsrat]. (1936). Entwicklungsgeschichte des tierärztlichen Berufes

und Standes in Deutschland. [**History of the Development of the Veterinary Profession in Germany**]. pp. viii + 490. 1 table, 2 photographs. [Numerous refs.] Berlin: Richard Schoetz. [8vo] [RM. 12.5].

This work could have been written by no one other than Reinhold Schmaltz. As editor of the *Berliner tierärztliche Wochenschrift* since 1888, he has been at the centre of veterinary politics in Germany and has taken a prominent part in every activity for improving the status of the veterinary surgeon. His journal was the storehouse or safe-deposit in which he recorded from week to week the important events in the progress of the profession, and it is this accumulation of historical material which is the source of most of the information contained in this volume.

S. begins with a history of the establishment of veterinary schools in Germany: Berlin 1790, Hanover 1778, Dresden 1780, Munich 1790, Giessen 1829, and Stuttgart 1821. Berlin began with two professors, NAUMANN and SICK, both trained at Alfort. GURLT, an anatomist, went to Berlin in 1818, and became the founder of comparative anatomy. With him was HERTWIG, an outstanding clinician, and these two had a great influence on German veterinary science. GERLACH, who had been appointed Director at Hanover in 1859, went as Director to Berlin in 1870 at 76 years of age and remained there until his death in 1877. In 1878 a new ordinance came into force improving the status of the school and marking the beginning of a new era.

At Hanover, Johann Adam KERSTING (1727-1784), a general practitioner, was the first professor and was followed by HAVEMANN, who died in 1819. HAUSSMANN (famous for his discoveries in genetics and embryology) was his assistant in 1812, but he went to England with the royal stud during the French occupation. J. H. F. GUNTHER (author of "Topographic Myology" and inventor of the well-known "roaring" operation) became Director in 1847, followed by GERLACH in 1859, Karl GUNTHER in 1870 and DAMMANN in 1880. All these stand high in German veterinary annals.

WEBER at his own cost built the first veterinary school in Dresden. RUMPELT, G. K. HAUBNER, REICHENBACH, SUSSDORF, HARTMANN, LEISERING, SIEDAMGROTSKI and JOHNE are some of the famous men of this school.

At Munich, MUNK, ABDERHALDEN, KREUTZER, PROBSTMAYR, FRIEDBERGER, BOLLINGER and FRANCK made their names.

Giessen produced JACOB, SCHAUDER, NEBEL, PFLUG and EICHBAUM.

Stuttgart is famous on account of HERING, FRÖHNER, OSTERTAG, GMELIN and STANG.

In Chapter II Schmaltz briefly sketches the early history of veterinary literature, beginning with COLUMELLA, A.D.60. As in England, it was in the 17th century that books on farriery became numerous. In the 18th century there began some improvement, and one of the best books of the period was by a Scot named ROBERTSON on the "Art of Equine Medicine" which, between 1753 and the end of the century, ran into 11 editions.

Again as in England, this early literature had no direct influence on the development of the science in the 19th century. An entirely new beginning was made, founded on the works of the professors and practitioners trained in the veterinary schools.

GURLT (1794-1882) was the founder of veterinary anatomy, his "Atlas" being the origin of the great work of ELLENBERGER and BAUM. In histology, SCHLEIDER and SWANN, KOLLIKER and STÖHR are the great names. In pathology, HERTWIG and SPINOLA, followed by GERLACH and GUNTHER, HAUBNER and HERING were the pioneers, and these and their successors up to the present day all have their place in this compendious work. The history of the periodical literature is

told in similar detail. The first veterinary journal to be published in Europe was the *Schweizer Archiv*, founded in 1816. This was followed by the *Recueil de Médecine vétérinaire* in France (1824) and the *Veterinarian* in England (1828). The first German journal, *Die Deutsche Zeitschrift für die gesamte Tierheilkunde*, which ran from 1828 to 1850, was not very important, but the *Magazin für die gesamte Tierheilkunde* of GURLT and HERTWIG, founded in 1835, ranks with the three above-named, and was the forerunner of the present *Archiv für Tierheilkunde*. The *Münchener tierärztliche Wochenschrift*, which grew out of the *Tierärztliche Wochenblatt* founded in 1849, is the oldest weekly. The *Berliner tierärztliche Wochenschrift* founded in 1888 (the same year as the *Veterinary Record*) was the first weekly to devote itself to questions affecting the status of the profession ; it is Schmaltz's life-work. During the half century of its activity it has been the recognized official organ of the profession. The *Zeitschrift für Fleischbeschau*, founded in 1885, became in 1890 under von OSTERTAG the present flourishing *Zeitschrift für Fleisch- und Milchhygiene*. In 1892 an opposition journal to the *Berliner*, the *Deutsche tierärztliche Wochenschrift*, was founded by LYDTIN, DAMMANN and SCHÜTZ, and, with the *Tierärztliche Rundschau*, begun in 1894, gives the German veterinarian a choice of four good weekly journals.

Chapter III of this work deals with the development of the control of contagious diseases of animals. Modern veterinary science owes its growth to two main stimuli :– first, the love of horses and second, the disasters of contagious diseases of farm animals. The Berlin School, in contrast to most veterinary schools, was founded mainly for the training of cattle practitioners.

Schmaltz rapidly surveys the history of cattle plagues. In Germany the beginning of an official veterinary service, to effect some control of contagious diseases, dates from 1817. From that date a veterinary inspector was to be appointed to function in every district, though it was not everywhere found to be possible, but by 1848 there were official veterinary surgeons allotted to every department and 159 veterinary surgeons controlled 325 districts. The service saw many vicissitudes but in Prussia, in 1875, the first Contagious Diseases of Animals Act was passed, and this had an epoch-making effect on the status of the profession. The District Veterinary Officer came into his own, and another effect was the granting of academic status for veterinary schools. Schmaltz sets out in detail who were the personalities and prime movers in these activities. MARCARD (1826-1892), KUSTER (1858-1915) and SCHRÖTER (1860-) are the outstanding names among laymen to whom is due the proper recognition of the role which the veterinarian should play in public health. MARCARD (Under-Secretary of State, 1874-1892) is credited as being the creator of the Contagious Diseases of Animals Act. His adviser was GERLACH. KUSTER, a lawyer, was also very sympathetic to the profession and SCHRÖTER's great work was the building of the German meat inspection system which von OSTERTAG was to bring to such perfection.

The development of Meat Inspection in Germany, which forms Chapter IV, is a story which fitly terminates with a short biography of Robert von OSTERTAG, who, born in 1864, took his diploma at Berlin in 1884, and became Slaughterhouse Inspector at 21. He was made Doctor of Medicine (Freiburg) in 1887, and in 1890 he founded the *Zeitschrift für Fleisch- und Milchhygiene* which he has edited ever since. His " Handbook of Meat Inspection," first issued in 1892, has run into 20 editions, and with its English translation must be one of the most widely used of veterinary text-books.

Chapter V, on the development of the German Veterinary Schools into Schools of University standing, occupies 126 pages and in this matter the author was one of the chief actors. He was opposed by a group of whom DAMMANN was the most

influential, but finally Schmaltz won his battle for academic status (1902). The Army Farriery School became the Military Veterinary Academy, and the Berlin School became the Veterinary High School, with FRÖHNER as its first Rector (1904-1906). Schmaltz, appointed Rector in 1907, was the first to be entitled to the appellation " Magnificenz " (1910). The German Veterinary High Schools became, in 1910, entitled to grant the degree of Doctor of Veterinary Medicine. As in England, there has been in recent years an increased demand for admission to the veterinary schools, though not in the same proportion. The highest point reached was in 1932, when there were 2,003 students in attendance at the five German schools. In 1934-1935 the number dropped to 1,730, but that is at least 500 more than we have in the five British schools.

The status of the profession in relation to the German Army is described in the 58 pages which form Chapter VI. From being the cinderella of the services, as it was before the war, the Army Veterinary Service is now at the pinnacle of professional status. This chapter gives a detailed history of the various steps in this development. As in England, veterinary surgeons were first attached to regiments, but in Germany commissioned rank was not granted until 1909.

Chapter VII deals with the subject of general practice. As in this country, the number of veterinary surgeons in private practice has diminished in the last 20 years, but competition is not so great as it was. In 1933, district veterinary officers were forbidden to engage in private practice. The total number of veterinary surgeons in the Reich in 1934 was 7,765, and of these 5,063 were in general practice.

The remaining chapters of this great work deal with the history of the International Veterinary Congresses, and the establishment of the German Veterinary Associations and their co-ordination with the German Veterinary Council. These chapters are of the utmost interest as showing how many difficulties and disappointments have to be faced before a profession can be properly organized. The local associations, as in this country, had little influence on general policy, and the more far-seeing veterinarians, from KREUTZER (1842) onwards, continually strove for the formation of a central representative body. This was achieved when the Deutsche Veterinärrat was formed in 1874. It exerted a powerful influence on the progress of the profession, and continued to function until the new Reich came into being. DAMMANN, LYDTIN, ESSER, LOTHES and ALTHOF were the most famous of its presidents.

It is impossible in a short review to do justice to this work. It must have involved tremendous labour, for every page is packed with names and dates and facts. It is a complete history of every phase of German veterinary progress during the last 150 years, and will remain a lasting memorial to the learning, industry and enthusiasm of the author.—F. BULLOCK.

FINZI, G. [Prof. della R. Università di Milano]. (1936). Le " Esotubercoline " in medicina umana e veterinaria. [**Exotuberculin in Human and Veterinary Medicine**]. pp. 306. [Numerous refs.] [English, French, German and Spanish summaries]. Cremona: Stabilimento Tipografico Società Editoriale " Cremona Nuova ". [8vo] [L.30].

F. reviews the experimental work which has been carried out by himself and others to establish the value of exotuberculin as an agent for the detection of tuberculosis in animals and man.

He describes the preparation and properties of the substance [*V. B.* **5.** 255.] and also gives an account of the preliminary experiments which convinced him that exotuberculin possesses many advantages over the old tuberculin. These may

be summarized as follows :– the preparation of exotuberculin is much simpler and cheaper than that of the old tuberculin, smaller doses may be used for the subcutaneous test, and the reaction produced is more intense. Moreover, it is said that the degree of infection and individual sensitivity do not interfere with the intensity of the reaction produced by exotuberculin. He claims that in no cases have non-tuberculous animals given a positive reaction to this reagent, and that there does not appear to be the same likelihood of animals becoming desensitized when repeated doses are given.

Exotuberculin may be used for the intradermal test in doses of 0·25 c.c. It is recommended, however, that doses of 2 c.c. should be given intramuscularly and the result of the test judged by the general reaction produced as in the old subcutaneous test. If, at the same time, the conjunctival test be applied, any chance of obtaining a doubtful reaction is said to be avoided.

Exotuberculin is said to have proved itself to be of value for the diagnosis of tuberculosis in horses, goats, dogs and fowls as well as in cattle. In goats, the conjunctival test, using 0·5 c.c. as the test dose, is said to have given satisfactory results. In dogs, 0·5 to 1 c.c. injected intramuscularly produces a marked general and local reaction in affected animals.

It was found that, if exotuberculin is heated to from 41° to 42°C., it loses its diagnostic value, but still produces flocculation when added to serum from tuberculous patients. It is suggested that, in this case, the specific proteins associated with the exotoxins have been removed, but that a specific carbohydrate still remains which is responsible for producing the flocculation. This product has been called " extinguished exotuberculin " and is claimed to have been used successfully in the treatment of tuberculosis in human patients.

Exotuberculin possesses the advantage of not being subjected to heat or other interference during the course of its preparation.—J. A. Nicholson.

Harvey, W. C. [M.D., D.P.H., M.R.San.I., Med. Offr. Hlth, Borough of Southgate], & Hill, H. [M.R.San.I., A.M.I.S.E., M.S.I.A. Sanitary Inspector Borough of Southgate]. (1937). **Milk Products.** pp. viii + 388. 73 figs., 15 tables. London : H. K. Lewis & Co., Ltd. [8vo] [16s.]

" Milk Products " is the combined work of a Medical Officer of Health and a Sanitary Inspector. As pointed out by the authors, it is a companion handbook to a previous publication, " Milk, Production and Control " [*V. B.* **6.** 567.] by the same authors. The book is well written, is liberally illustrated, and the print is good.

It is to be regretted that, in the first chapter on ice-cream, the authors did not take the opportunity of introducing a standard definition of ice-cream which would meet the conditions of legislative control in this country.

Margarine, though not a milk product, is wisely included in the chapter on butter. The description of the various forms of cheese is good, though the information on the various abnormalities of cheese is somewhat curtailed. Much useful information is given on the manufacture of condensed milk and of various forms of dried milk.

At the end of each chapter the present-day legislation affecting the product is dealt with fully.

It is an excellent book of great practical value. It summarizes in a readable form knowledge of the manufacture, treatment and examination of the various milk products in general use, and will be found most useful for officers engaged on food inspection and as a text-book for students.—Brennan DeVine.

Dixey, R. N. (1937). **Tuberculin Tested Milk. A Study of Reorganisation for**

its Production. pp. 111. 17 tables. [Numerous refs.] Oxford: Agricultural Economics Research Institute. [8vo] [2s. 6d.]

The "cleaning up" of the milk supply is agreed to be one of the most urgent reforms of the day, but there is considerable divergence of opinion on the immediate measures to be adopted. The author says that one way is to pasteurize all milk and another is to guarantee obtaining safe milk from the cow; the latter method is preferable, but there is a belief that the cost would be prohibitive. D. deals fully with the arguments in favour of pasteurization and emphasizes certain difficulties, which would have to be overcome in its application to rural districts and in order to ensure that it was properly carried out.

This book is founded upon a survey of costs actually incurred by farmers who have reached the standard of producing "tuberculin-tested milk". There are records of the reorganization undertaken on 180 farms, and of the extra capital involved. In ordinary circumstances the latter works out at about £13 a cow; it is pointed out, however, that about £7 of this sum is due to the cost of bringing the buildings up to a standard to which every dairy farm is expected to attain before it is officially considered fit to produce any milk at all. Extra equipment for washing, sterilizing, etc. accounts for £2.10.0 and between £3 and £4 per head is involved in the replacement of reactors. All these costs are discussed in detail. The possibility of making "tuberculin tested milk" available for general distribution is discussed.—J. C. WALLACE.

GUYER, M. F. [Prof. Zoology, University of Wisconsin]. (1936). **Animal Micrology. Practical Exercises in Zoological Micro-Technique.** pp. xvi + 331. 76 figs., 1 table. [11 refs.] Chicago: The University of Chicago Press; London: The Cambridge University Press; Tokyo, Osaka, Kyoto, Fukuoka & Sendai: The Maruzen-Kabushiki-Kaisha; Shanghai: The Commercial Press, Ltd. [4th Edit.] [4to] [11s. 6d.]

After 30 years of life this helpful book now appears in its revised fourth edition – a fact affording proof of its popularity with scientific workers. Many books dealing with technical matters suffer from involved explanation, but the book under review is terse and to the point, so that the veriest beginner may proceed with confidence. Chapter VII, a notable addition, describes Graupner's and Weissberger's dioxan method by which the alcohols and xylol may be omitted from the technique of embedding. This method, Guyer points out, is suitable for such objects as ovaries, pigeon embryos, decalcified bone and other material which frequently undergoes shrinkage when treated by the usual methods. Other chapters are concerned with such matters as fixation, metallic substances for colour-differentiation, embryological methods, reconstruction methods, and drawing: these suffice to show the comprehensive, yet not exhaustive, nature of the work. Limits of space forbid mention of other noteworthy features, but the book can be heartily recommended as precise, informative, and in every way a highly useful manual for the laboratory worker.—C. HORTON-SMITH.

GRÜNEBERG, H. [Ph.D. Berlin; M.D. Bonn]. (1937). **Elementary Genetics for Students of Biology and Medicine.** pp. 87. 1 fig., 3 tables. Edinburgh: E. & S. Livingstone. [8vo] [1s. 6d.]

The publishers of the Catechism Series are to be congratulated on the production of this concise account of the theory of genetics and its application to human medicine. Mendelism, the chromosome theory of inheritance, the mechanism of sex-determination and sex-linkage are briefly but clearly expounded. Examples of several inherited characters and pathological conditions in man are given. The booklet should prove a useful introduction to the study of genetics for veterinary students.—N. J. SCORGIE.